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ABSTRACT

These proceedings contain eight papers presented at the meeting, each followed by a critique. Major areas studied are home schooling, incorporating agriscience and biotechnology in agricultural education, part-time employment by agricultural education teachers, 4-H, attitudes of Agricultural Science Institute participants, client satisfaction, and adult education philosophies. The papers are "Perceptions of the Benefits and Problems Associated with Part-Time Employment by Secondary Teachers of Agricultural Education" (Connie McClung Scarbrough, Harry N. Boone, Jr., Layle D. Lawrence, Stacy A. Gartin, Kerry S. Odell; Critique by Blannie E. Bowen); "Attitudes and Knowledge of Biotechnology by West Virginia Agricultural Education Teachers" (Jason E. Hughes, Harry N. Boone, Jr., Stacy A. Gartin, Kerry S. Odell, Layle D. Lawrence, Robert A. Dailey; Critique by Blannie E. Bowen); "Attitudes, Knowledge, and Implementation of Agriscience by West Virginia Agricultural Education Teachers" (Jason E. Hughes, Stacy A. Gartin, Harry N. Boone, Jr., Kerry S. Odell, Layle D. Lawrence, Robert A. Dailey; Critique by Blannie E. Bowen); "North Carolina Home School Providers' Perceptions of Agricultural Education" (R. Jason Walls, James L. Flowers, Gary E. Moore; Critique by Blannie E. Bowen); "Attitude Formulation of Food and Agricultural Sciences Institute Participants: A Longitudinal Assessment" (Frank L. Cox, Blannie E. Bowen, Cathy F. Bowen; Critique by Deborah A. Boone); "Measuring and Benchmarking Client Satisfaction: Implications for Program Improvement and Accountability" (Rama Radhakrishna; Critique by Deborah A. Boone); "4-H Volunteers and the Internet--A Partnership for the Future" (Claudia C. Mincemoyer; Critique by Deborah A. Boone); and "Philosophies of Adult Education as Practiced by Agricultural Education Teachers" (Harry N. Boone, Jr., Crystal R. Buckingham, Stacy A. Gartin, Layle D. Lawrence, Kerry S. Odell; Critique by Deborah A. Boone). (Most papers contained extensive references.) (YLB)

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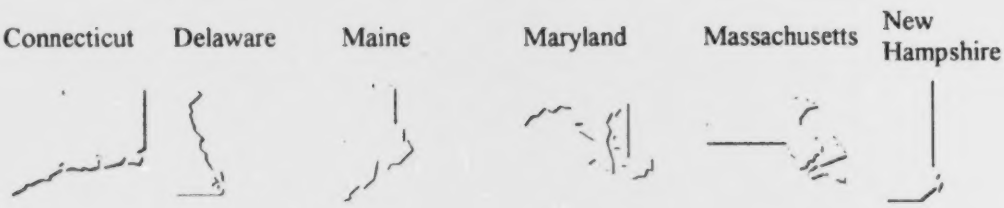

Research in Agricultural Education

Proceedings of the 55th Annual AAAE Eastern Region Research Conference

July 6, 2001
Baltimore, Maryland
Volume 55

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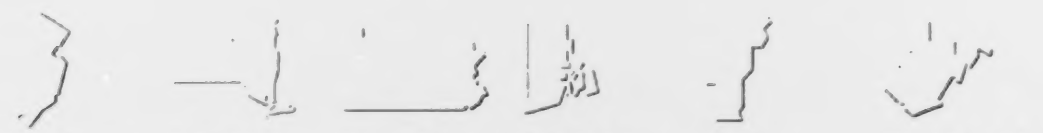

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Preface

Welcome to the 55th Annual Eastern Region Agricultural Education Research Conference of the American Association for Agricultural Education (AAAE), July 6, 2001 in Baltimore, Maryland. The Conference is being held in conjunction with the Region VI, MATA Summer Conference.

As resources and staff in agricultural education dwindle, research has to remain a priority. Research is the vehicle whereby we advance our profession, expand our knowledge base, and take full advantage of new developments in education and the agriculture profession.

As our programs become more complex and as the people involved change, so too do our research efforts. The research reported in the 2001 Conference continues to focus on timely topics and issues relevant to the profession. The research presented here addresses real problems and concerns confronted by the practitioners. This year's call for papers generated a response of twelve papers. Of those submitted, eight, or 67 percent, were selected to be presented at this meeting and to be included in these proceedings.

A wide range of research is being reported in the region this year. A brief review of the titles of papers accepted for presentation indicated that major areas studied were home schooling, incorporating agriscience and biotechnology in agricultural education, part-time employment by agricultural education teachers, 4-H, attitudes of Agricultural Science Institute participants, client satisfaction, and adult education philosophies.

Continuous research and development are needed to keep our profession abreast of the changing nature of our work.

Conference Chair
Harry N. Boone, Jr.
West Virginia University

Acknowledgements

Referees

Connie D. Bagget, The Pennsylvania State University
Deborah A. Boone, Consultant, Agricultural and Extension Education
Tom H. Bruening, The Pennsylvania State University
Carol Hodes, The Pennsylvania State University
Stanley Hopkins, WV Division of Technical and Adult Education Services
David Howell, University of New Hampshire
Alfred J. Mannebach, University of Connecticut
Kerry S. Odell, West Virginia University

Discussants

Blannie E. Bowen, The Pennsylvania State University
Deborah A. Boone, Consultant, Agricultural and Extension Education

Facilitators

Tracy Hoover, The Pennsylvania State University
Kerry S. Odell, West Virginia University

Conference Planning

Naomi W. Knight, Hartford Tech High School, Maryland

55th Annual AAAE Eastern Region Research Conference

Program

July 6, 2001
Baltimore, Maryland

6:30 - 6:45 p.m. Conference Orientation

Harry N. Boone, Jr.
Chair, West Virginia University

6:45 - 9:30 p.m. Presentation of Research Papers

Concurrent Session A

Facilitator: Tracy Hoover
Associate Professor, The Pennsylvania State University
Discussant: Blannie E. Bowen
Professor & Head, C. Lee Rumberger & Family Chair
The Pennsylvania State University

Perceptions of The Benefits and Problems Associated With Part-Time Employment by Secondary Teachers of Agricultural Education

Connie McClung Scarbrough, Agricultural Education Teacher, Ripley High School, Ripley, WV
Harry N. Boone, Jr., Assistant Professor, West Virginia University
Layle D. Lawrence, Professor, West Virginia University
Stacy A. Gartin, Professor, West Virginia University
Kerry S. Odell, Associate Professor, West Virginia University
Jean M. Woloshuk, Associate Professor, West Virginia University

Attitudes and Knowledge of Biotechnology by West Virginia Agricultural Education Teachers

Jason E. Hughes, Agricultural Education Teacher, St. Mary's High School, Pt. Pleasant, WV
Harry N. Boone, Jr., Assistant Professor, West Virginia University
Stacy A. Gartin, Professor, West Virginia University
Kerry S. Odell, Associate Professor, West Virginia University
Layle D. Lawrence, Professor, West Virginia University
Robert A. Dailey, Professor, West Virginia University

Attitudes, Knowledge, and Implementation of Agriscience by West Virginia Agricultural Education Teachers

Jason E. Hughes, Agricultural Education Teacher, St. Mary's High School,

Pt. Pleasant, WV
Stacy A. Gartin, Professor, West Virginia University
Harry N. Boone, Jr., Assistant Professor, West Virginia University
Kerry S. Odell, Associate Professor, West Virginia University
Layle D. Lawrence, Professor, West Virginia University
Robert A. Dailey, Professor, West Virginia University

North Carolina Home School Providers' Perceptions of Agricultural Education

R. Jason Walls, Public Relations Director, Prestage Farms, Inc.
James A. Flowers, Interim Department Head, North Carolina State University
Gary A. Moore, Director of Graduate Studies, North Carolina State University

Concurrent Session B

Facilitator: Kerry S. Odell
Associate Professor, West Virginia University
Discussant: Deborah A. Boone
Consultant, Agricultural and Extension Education, Morgantown, WV

Attitude Formulation of Food and Agricultural Sciences Institute Participants

Frank L. Cox, 4-H Youth Agent, Muskegon County Extension, Muskegon, MI
Blannie E. Bowen, Professor & Head, C. Lee Rumberger & Family Chair, The Pennsylvania State University
Cathy F. Bowen, Assistant Professor, The Pennsylvania State University

Measuring and Benchmarking Client Satisfaction: Implications For Program Improvement and Accountability

Rama Radhakrishna, Associate Professor, The Pennsylvania State University

4-H Volunteers and the Internet: A Partnership for the Future

Claudia C. Mincemoyer, 4-H Curriculum Specialist, The Pennsylvania State University

Philosophies of Adult Education as Practiced by Agricultural Education Teachers

Harry N. Boone, Jr., Assistant Professor, West Virginia University

Crystal R. Buckingham, Agricultural Education Teacher, Monongalia Technical Center, Morgantown, WV
Stacy A. Gartin, Professor, West Virginia University
Layle D. Lawrence, Professor, West Virginia University
Kerry S. Odell, Associate Professor, West Virginia University

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PERCEPTIONS OF THE BENEFITS AND PROBLEMS ASSOCIATED WITH PART-TIME EMPLOYMENT BY SECONDARY TEACHERS OF AGRICULTURAL EDUCATION

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55th Annual AAAE Eastern Region Research Conference
July 6, 2001, Baltimore, Maryland

PERCEPTIONS OF THE BENEFITS AND PROBLEMS ASSOCIATED WITH PART-TIME EMPLOYMENT BY SECONDARY TEACHERS OF AGRICULTURAL EDUCATION

Abstract

The purpose of the study was to examine the self-perceived potential benefits and/or problems of part-time employment on the job performance of secondary teachers of Agricultural Education. The population consisted of 108 agricultural educators who held teaching positions during the 2000-2001 school year in West Virginia, Ohio, and Kentucky and were employed within a 150-mile radius of Ripley, West Virginia. A descriptive research design was used for the study. Demographic data on the respondents were collected in addition to their perceptions of the potential benefits and/or problems of part-time employment. Over 92% of the respondents were male, while nearly 8% were female. There were 54.4% of the respondents over the age of 40 with a surprising 7.4% of the respondents still teaching after the age of 65. Nearly 74% of those surveyed had over 10 years teaching experience while 25% had taught over 25 years. Less than forty percent of the respondents had a contract less than 12 months. There were 4.4% employed on a 9-month contract. Forty-eight percent of the respondents were employed in a one-teacher department. Fifty-nine percent of the respondents were engaged in part-time employment activities. Of those 59% who moonlighted, almost half reported the part-time employment accounted less than 1-10% of their gross income (46.3%). There were 17% involved in part-time employment earning 11-25% of their gross income, while 22% were earning at least 25-50% of their income from other employment endeavors. A major finding of the research was that there are strong feelings as to the benefits and problems associated with these activities and that over 50% of agricultural teachers were involved in some kind of part-time employment. Agricultural educators are experiencing benefits, as well as problems, associated with their involvement in part-time employment.

Introduction

The agriculture industry continues to be America's largest employer. Past innovators in the fields of agriculture were cognizant of the importance of this industry in the development and success of the nation and of the need for young people to be trained to fill vacancies in this vital industry. The passage of the Smith-Hughes Act in 1917 provided federal funding to incorporate agricultural education into the curricula of secondary public schools for the purpose of establishing students in agricultural careers. In recent years, agricultural education has evolved to include agribusiness occupations as well as many specialized types of farming.

While the curriculum has changed, the basic elements of the agricultural education program; classroom/laboratory instruction, supervised agricultural experience programs, and FFA, have remained the same. According to Phipps and Osborne (1988) in their Handbook on Agriculture Education in Public Schools, the agricultural education program should include a balanced mixture to be successful. It should include classroom activities such as exploration of supervised agricultural experience programs and problem-solving techniques, which will direct students into realistic and profitable production or agribusiness experience programs. The program was designed to allow the teacher to spend time supervising students during initiation of agricultural experience programs and subsequent visits to increase scope and quality.

The job of the agricultural educator includes a variety of activities, and much time must be given to the satisfactory completion of these designated elements of the program. Teachers, teacher educators, state supervisors, and even administrators have questioned the feasibility of an agricultural educator performing his/her teaching responsibilities, as well as engaging in part-time farming and/or agribusiness enterprises.

Problem Statement: Because teacher educators, state supervisors, administrators, and to some degree, the general public perceive teaching secondary school agricultural education as a full-time profession, it is important to establish the degree to which agricultural education teachers are engaged in part-time employment activities. In addition to the level of involvement in part-time employment, it is important to establish the benefits and problems associated with these activities.

Limitations of the Study: The study was limited to West Virginia, Kentucky, and Ohio secondary agricultural educators who held positions teaching during the 2000-01 school year. The study was further limited to teachers employed in a 150-mile radius of the Ripley, West Virginia area. The data collection efforts were limited to self-reported perceptions of the effects of farming, agribusiness, and/or other employment involvement on job performance of the agricultural educator.

Definitions: The following terms are important to the understanding of concepts discussed in this study:

1. **Part-time employment**: refers to employment endeavors that are in addition to a full-time career, including year-round and seasonal activities. It was assumed that teaching secondary agricultural education was the full-time career.
2. **Moonlighting**: the holding of a second job in addition to a regular one (Merriam Webster, 1999).

Theoretical/Literature Base

Moonlighting is commonly understood as holding a second job in addition to a regular one (Merriam Webster, 1999). The Bureau of Labor Statistics goes beyond the dictionary definition in describing moonlighting by calling the practice 'Multiple Jobholding' (1999). According to the Bureau of Labor Statistics, over seven million Americans work at more than one job. Most of the existing research makes one of two basic assumptions about why people moonlight. The reasons for moonlighting are because they need to (financial explanation) or because they want to (enjoy variety and challenges) (Betts, 2000).

Many teachers moonlight. In fact, approximately 15% of public school teachers in the US hold more than one job during the academic year (Bobbitt, 1988, 1990). There are countless journal articles on the subject from teachers who have had to supplement their income. For many teachers, moonlighting is an economic necessity. Dedication to their students and a love of teaching inspire them to remain in the field, but they have trouble making ends meet (Ladestro, 1990). In Moonlighting Professionals: A Study of Full-Time Teachers and Their Part-Time Work, Carroll (1994) found that moonlighters tend to be younger, better educated, and less satisfied with current employment than other teachers. In several studies, results suggest that moonlighting is an attempt to raise living standards (Pearson, 1994). Traditionally teachers' jobs

have been conducive to the moonlighting lifestyle. They have many days off during the school year and in most cases, their summers are free. Their daytime hours are for the most part fairly regular, thus affording the would-be moonlighter the chance to take an evening job with another set of regular hours. Teachers have relatively low paying jobs, compared to other professionals, and this also sets the stage for a moonlighting scenario. Although salaries are part of moonlighting's attractiveness to teachers, the occasional and short-lived character of many moonlighting spells suggests that teachers often take second jobs in order to meet short-term cash flow problems (Ballou, 1995). For other teachers, financial need is not the only reason for holding a second job (Ballou, 1995).

Moonlighting studies as they relate to classroom performance are also abundant. Two recent studies suggest there are very different views on the subject. A series of surveys of Texas teachers has consistently found that a majority of those who moonlighted regarded it as detrimental to their teaching (Henderson & Schlesinger, 1988). However, in another study, only nine percent of respondents to Raffel and Groff (1990) said that moonlighting impaired their teaching performance. Estimates from another study found no support for the view that moonlighting teachers spend substantially less time preparing lessons and grading papers than their colleagues (Ballou, 1995).

A profession is defined as a calling requiring specialized knowledge and academic preparation (Merriam Webster, 1999). Further, it is a principal employment. As teachers desire to be called professionals, do their secondary employment endeavors take away from this image of a professional? Moonlighting is said to detract from professionalism, thereby making it more difficult to attract capable persons into teaching (Bell & Roach, 1988). Outside employment reduces the time teachers have to read professional journals, attend conferences, and otherwise keep up with developments in their fields (Boyer, 1983).

When a teacher moonlights in their chosen area of study, such as an accounting teacher being a tax preparer or an auto-body instructor with a car repair business outside of the school system, where are the lines drawn? Do people view this as a natural extension of the teacher's work at the school, or is it viewed as an interference? Do they see it as a validation of their teaching or a conflict of interest?

Examining the other side of the issue, it has been reported that farmers often need to moonlight in nonfarm jobs in order to remain in the business (Daly, 1981). According to 1997 Census of Agriculture data, there were 10,627 operators of farms in West Virginia whose principal occupation was employment of a non-agricultural nature (Glickman, 1997). There has been much written on the subject of part-time farming, but little has been reported on the job performance of teachers of agriculture who engage in farming and/or agribusiness endeavors in addition to their teaching responsibilities.

Part-time farming has come to be recognized as a permanent component of the agricultural structure of developed countries (Gasson, 1986). A special issue of Cooperative Farmer Magazine devoted to part-time farming reported that:

> The part-time farmer probably lives within 50 miles of a small city where he [sic] works; needs off-farm income of about $40,000 to play the game; and typically spends about $7,000 annually on expenses except land which he may own or rent cheaply, probably

> from a family member. He hopes to make a profit, prays to break even, and usually gets out to cut his losses if neither happens. (Graham, 1988, p. 3)

Although this paints a rather negative picture of the part-time agriculturist, it is, however, correct to assert that many part-time farmers and/or agribusiness persons possess valuable skills and competencies that make running these operations profitable.

The job of the vocational agriculture teacher is to incorporate a combination of technical knowledge, marketable skills, and profit making practices into the total program of instruction, which will produce students who are proficient to a degree that will allow for their establishment in production or an off-farm agricultural operation. Smith (1950) reports his findings by stating:

> We insist in vocational education that 'learning to do' results from 'doing' or guided participation. Shall we assume that this principle is as directly applicable in the training of teachers as it is in the preparation of a student for farming? (p. 51)

In 1991, Harper conducted a study where he asked head teacher educators and state supervisors of agricultural education in the 48 contiguous states to identify the benefits and problems of secondary agricultural educators participating in part-time farming activities outside their full-time teaching position. The participants identified twenty-two benefits and forty-two problems associated with part-time farming on the job performance of agricultural education teachers who engage in these activities. The head teacher educators and state supervisors rated the problems associated with part-time employment in farming or agribusiness higher than they did the benefits.

Summary: Although about 5 percent of all U.S. workers hold second jobs, 300,000 teachers or seventeen percent of America's 2 million teachers, were employed outside the school system during the school year. According to Alley and Ballenger (1990), moonlighting adversely affects teacher recruitment, job stress, and teacher efficacy. There was no current information concerning the number of agricultural educators who moonlight, the type of employment endeavors in which they participate, and if their job performance was harmed or enhanced as a result of the multiple job holdings.

Purpose and Objectives

Purpose of the Study: The purpose of the research was to determine secondary agricultural educators' opinions on the benefits and problems associated with multiple occupational endeavors involving the teaching responsibilities of the agricultural education instructor and practical part-time farming, agribusiness, and/or other employment activities. Another aspect of the research was to identify the number of agricultural educators who were engaged in other part-time employment pursuits and to identify the nature of these endeavors.

Objectives of the Study: The primary objective of the research was to determine how West Virginia, Kentucky, and Ohio agricultural educators employed within a 150-mile radius of the Ripley, WV area perceive the benefits and problems of part-time farming, agribusiness, and/or other employment endeavors on professional job performance.

Secondary objectives include:

1. Identify the number of agricultural educators engaged in part-time farming, agribusiness, and/or other employment endeavors in West Virginia, Ohio, and Kentucky.
2. Determine the extent to which agricultural teachers supplement their income by means of part-time farming, agribusiness, and/or other employment enterprises.

Methods/Procedures

Population: The target population of the study was secondary school agricultural educators in West Virginia, Ohio, and Kentucky who were teaching during the 2000-01 school year. The population was further limited to those teaching within a 150-mile radius of Ripley, West Virginia. Lists were secured from state supervisors and all teachers within this area were identified. It was determined that Ohio had a much larger number of agriculture teachers per district than those in the same area of West Virginia and Kentucky. Since the study was self-funded, and cost restraints were a factor, the decision was made to take a random sample of teachers from Ohio. A random sample procedure was used which included every third person from the census of secondary agricultural education teachers in Ohio's Regions 8 and 10. The accessible population was 108 secondary agricultural education teachers; 35 from West Virginia, 34 from Kentucky, and 38 from Ohio.

Instrumentation: The questionnaire items used in this study were based on a list of benefits and problems of part-time employment of secondary agricultural education teachers identified by teacher educators and state supervisors (Harper, 1991). The questionnaire inquired about perceptions of the benefits and problems associated with part-time employment by secondary agricultural educators and demographic information of each participant.

The questionnaire was examined for content validity by faculty members at West Virginia University. The instrument was pilot tested using secondary agricultural education teachers on the West Virginia Agricultural Education Association's (WVAEA) Program and Policy Committee. A Cronbach's alpha reliability coefficient was calculated using data from questionnaires completed by the Program and Policy Committee members. The reliability coefficient of this instrument was .97. Requirements of the Human Subjects Review Board of West Virginia University were met.

Research Design: A descriptive research design was selected to collect the data necessary to answer the research questions. "Descriptive data is usually collected by using observation, interviews, and questionnaires. Descriptive studies range from simple surveys to studies that present explicit statements about the relationships between variables which approach the level of the explanatory hypothesis one finds in experimental research" (VanDalen, 1979, p. 285). "Descriptive research methodology provides for the generation of large amounts of data in a limited time frame" (Kaplin, 1991, p. 24).

Data Collection Procedures: A cover letter was developed that explained the purpose of the study and gave directions for completing and returning the questionnaire. The packet included a stamped, self-addressed envelope to facilitate the prompt return of the questionnaire. Procedures for administering mail questionnaires as recommended by Dillman (1978) were followed to increase the response rate. The final survey was color-coded by state. To thank

respondents for completing the survey and to expedite the return, a sharpened pencil personalized to say "Thank you for your time" was included.
Two weeks after initial surveys were mailed, a reminder post card was sent to each non-respondent. A follow-up letter and a second questionnaire were mailed to all non-respondents two weeks after the reminder post card. Early and late respondents were tracked during the data collection process.

Analysis of Data: Returned questionnaires were visually verified and entered in a Microsoft Excel spreadsheet. The data were transferred to the personal computer version of the Statistical Package for the Social Sciences (SPSS). Data analysis procedures included frequencies and means to describe the population.

Results and Conclusions

The accessible population consisted of 108 secondary agricultural educators in West Virginia (n = 35), Ohio (n = 38), and Kentucky (n = 34). Seventy-three questionnaires (68%) were returned. Of the 73 questionnaires returned, four were unusable. The final set of useable surveys numbered 69 (63.9%). Early respondents were compared to late respondents on their rating of the benefits and problems using analysis of variance statistical procedures. There were no statistical differences between the group therefore generalization were made to the entire population.

Demographic Data: Sixty-three of the respondents (92%) were male, while five (7.4%) were female. Participants were asked to identify their age using five-year increment categories. Forty-three respondents (61.7%) were between the ages of thirty-one and fifty-five years of age. Thirty-seven respondents (54.4%) were over the age of 40 while five of the respondents (7.4%) still teaching after the age of 65.

Thirty-two respondents (47.8%) taught in a single teacher department. Sixteen teachers (23.9%) taught in a two-teacher department, ten teachers (14.9%) taught in a three-teacher department, and nine teachers (13.5%) taught in a department with four or more teachers.

Fifty respondents (74.0%) had over 10 years teaching experience while seventeen (25%) had taught over 25 years. Four teachers (5.9%) had taught less than one year, nine teachers (13.2%) had taught between 1 and five years, and five teachers (7.4%) had taught between six and ten years.

Forty-two teachers (61.8%) had a 12-month teaching contract. Eleven teachers (16.2%) were employed for eleven months. Nine teachers (13.2%) were employed on a ten-month contract while three teachers (4.4%) indicated they were employed for nine months.

Forty-one respondents (60.3%) were engaged in part-time employment activities. Thirty-five respondents (51.5%) were involved in production agriculture endeavors. Twelve respondents (17.6%) were involved in agribusiness occupations. Seven respondents (10.3%) were involved in other non-agriculture employment. It should be noted that some teachers were involved in more than one category of part-time employment, therefore the total number of teachers involved in part-time employment is less than the total of those involved in part-time production agriculture, agribusiness, and other employment activities.

Table 1

Demographic Characteristics of Respondents Reported by State

	Total		Kentucky		Ohio		West Virginia	
	N	%	N	%	N	%	N	%
Gender								
Male	63	92.6	14	87.5	20	90.9	29	96.7
Female	5	7.4	2	12.5	2	9.1	1	7.4
Age								
21-25 years	6	8.8	0	0	2	9.1	4	13.3
26-30 years	6	8.8	0	0	1	4.5	5	16.7
31-35 years	6	8.8	2	12.5	1	4.5	3	10.0
36-40 years	10	14.7	4	25.0	3	13.6	3	10.0
41-45 years	13	19.1	2	12.5	6	27.3	5	16.7
46-50 years	10	14.7	4	25.0	1	4.5	5	16.7
51-55 years	9	13.2	4	25.0	1	4.5	4	13.3
Over 65 years	5	7.4	0	0	5	22.7	0	0
Missing	3	4.4	0	0	2	9.1	1	3.3
Department								
1 teacher	32	47.8	6	37.5	11	52.4	15	50.0
2 teachers	16	23.9	3	18.8	4	19.0	9	30.0
3 teachers	10	14.9	5	31.3	0	0	5	16.7
4 teachers	2	3.0	1	6.3	1	4.8	0	0
5 teachers	1	1.5	1	6.3	0	0	0	0
6 or more teachers	6	9.0	0	0	5	23.8	1	3.3
Teaching Experience								
Less than one year	4	5.9	2	12.5	0	0	2	6.7
1-5 years	9	13.2	0	0	4	18.2	5	16.7
6-10 years	5	7.4	2	12.5	0	0	3	10.0
11-15 years	10	14.7	3	18.8	4	18.2	3	10.0
16-20 years	11	16.2	3	18.8	4	18.2	4	13.3
21-25 years	12	17.6	3	18.8	3	13.6	6	20.0
More than 25 years	17	25	3	18.8	7	31.8	7	23.3
Teaching Contract								
12 months	42	61.8	13	81.3	9	40.9	20	66.7
11 months	11	16.2	0	0	6	27.3	5	16.2
10 months	9	13.2	1	6.3	4	18.2	4	13.3
9 months	3	4.4	0	0	3	13.6	0	0
Other	3	4.4	2	12.5	0	0	1	3.3

Table 2

Demographic Data as it Relates to Involvement in Part-Time Employment

	Total		Kentucky		Ohio		West Virginia	
	N	%	N	%	N	%	N	%
Part-time Employment – All Types								
No	27	39.7	4	25.0	10	45.5	13	43.3
Yes	41	60.3	12	75.0	12	54.5	17	56.7
Part-time Agriculture Employment								
No	33	48.5	5	31.3	12	54.5	16	53.3
Yes	35	51.5	11	68.8	10	45.5	14	46.7
Part-time Agribusiness Employment								
No	56	82.4	14	87.5	19	86.4	23	76.7
Yes	12	17.6	2	12.5	3	13.6	7	23.3
Part-time Other Employment								
No	61	89.7	15	93.8	20	90.9	26	86.7
Yes	7	10.3	1	6.3	2	9.1	4	13.3
Percentage of Gross Income								
1-10 %	19	46.3	3	25.0	6	50.0	10	58.8
11-25%	7	17.1	2	16.7	4	33.3	1	5.9
25-50%	9	22.0	5	41.7	1	8.3	3	17.6
51-75%	5	12.2	2	16.7	0	0	3	17.6
76% or more	1	2.4	0	0	1	8.3	0	0
Hours Part-Time Employment per Week								
1-10 hours	7	17.1	1	8.3	2	16.7	4	23.5
11-20 hours	20	48.8	7	58.3	4	33.3	9	52.9
21-30 hours	12	29.3	4	33.3	5	41.7	3	17.6
31-40 hours	1	2.4	0	0	0	0	1	5.9
40 hours or more	1	2.4	0	0	1	8.3	0	0
Years Part-time Employment								
Less than one year	1	2.4	0	0	0	0	1	5.9
1-5 years	5	12.2	2	16.7	2	16.7	1	5.9
6-10 years	2	4.9	0	0	1	8.3	1	5.9
11-15 years	6	14.6	2	16.7	3	25.0	1	5.9
16-20 years	1	2.4	0	0	0	0	1	5.9
21-25 years	6	14.6	2	16.7	1	8.3	3	17.6
More than 25 years	20	48.8	6	50.0	5	41.7	9	52.9

Of those respondents who were involved in part-time employment, nineteen respondents (46.3%) reported the part-time employment accounted for 1-10% of their gross income. Overall, there were seven respondents (17.1%) involved in part-time employment earning 11-25% of gross, while nine respondents (22.0%) earned at least 25-50% of their income from part-time employment endeavors. Five respondents (12.2%) reported earning between 51 and 75% of their

gross income from their part-time endeavors. One respondent (2.4%) reported earning over 76% of his/her gross income from part-time employment.

Twenty respondents (48.8%) reported working between 11 and 20 hours per week in their part-time employment. Twelve respondents (29.3%) reported working between 21 and 30 hours per week in their part-time employment. Two respondents (8.4%) reported working in excess of 30 hours per week in their part-time employment.

Twenty respondents (48.8%) reported being involved in part-time employment for more than twenty-five years. Fifty-thee respondents (80.4%) had been involved in part-time employment for over ten years.

Benefits and Problems of Part-time Employment: The benefits to the agricultural education program which result from the teacher's part-time employment as perceived by secondary school agricultural educators were analyzed and ranked. Respondents agreed that all 22 items were beneficial to the program as represented by a mean of 2.89 or greater. The highest ranked benefits were "personal satisfaction" (3.45), "teachers develop new knowledge and skill" (3.42), "teachers gain experience" (3.35), "supplemental income - stay in profession" (3.35), and "overcome financial needs – low salaries" (3.31). The lowest ranked benefits included: "helps attitude, prevents burn-out" (2.89), "enhances teacher confidence" (2.90), "cultivates student employment opportunities" (2.97), "keeps teacher aware of government programs" (3.03), "teacher can use business for field trips" (3.05).

The respondents indicated some level of agreement that forty out of forty-one problems identified by state supervisors and teacher education were in fact a problem of part-time employment. The only item the agricultural educators indicated was not a problem was "teachers teach content of part-time employment" (1.98).

The teacher's perceptions of problems associated with part-time employment were analyzed and ranked. The items considered to be the greatest problems were: "forces teachers to make judgments about time usage" (3.14), "conflict of interest – using agricultural education facilities" (3.08), " lack of time to spend with family" (3.05), "can become a second full-time job" (2.97), and " time not available when greatest need arises" (2.95).

The five items ranked the lowest by respondents (disagreement on the fact that the item was a problem) were "teachers teach content of part-time employment" (1.98), "results in a poor instructional program" (2.17), "tarnishes the professional image of agricultural education teachers" (2.19), teacher loses broader perspective of agriculture" (2.27), and "poor community involvement by teacher" (2.27).

Conclusions: Based upon the results of this study, the following conclusions were drawn:

1. Over half of teachers of high school agriculture were engaged in part-time employment.
2. Nearly half of the agriculture teachers who moonlight receive a modest compensation for their effort (1-10% of gross income).

3. Over half of agriculture teachers were over the age of 40 with some still teaching after the age of 65.

4. Only about 60% of agricultural education teachers had a 12-month contract.

Table 3

Perception of Benefits Associated with Part-Time Employment by Secondary Agricultural Education Teachers

Benefit	N	M	SD
Personal satisfaction	64	3.45	0.5324
Teachers develop new knowledge and skills	67	3.42	0.6312
Teachers gain experience	68	3.35	0.6639
Supplemental income - stay in profession	66	3.35	0.5682
Overcome financial needs - low salaries	65	3.31	0.6829
Provides work experience	68	3.28	0.5690
Helps apply theory into practice	67	3.27	0.5663
Teachers stay up to date	64	3.23	0.7714
Source of instructional examples	67	3.21	0.6637
Keeps teacher aware of employer expectations	65	3.18	0.5834
Broadens outlook about agriculture	64	3.16	0.6478
Keeps teacher aware of industry problems	64	3.14	0.7942
Keeps teacher aware of personnel issues	62	3.10	0.7177
Means to validate course content	64	3.09	0.6099
Use farm as laboratory	63	3.08	0.8482
Enhances management skills	64	3.08	0.7623
Keeps teacher current with industry language	62	3.06	0.7655
Teacher can use business for field trips	64	3.05	0.8248
Keeps teacher aware of government programs	63	3.03	0.8026
Cultivates student employment opportunities	64	2.97	0.6893
Enhances teacher confidence	60	2.90	0.8772
Helps attitude, prevents burn-out	64	2.89	0.9614

Rating scale: 1-Strongly disagree, 2-Disagree, 3-Agree, 4-Strongly agree

Implications: The review of literature and the results of the study yielded support for the idea that there are important benefits to those who moonlight and teach agricultural education. However, there are negative connotations associated with those who engage in multiple job holding. Positive public relations are important for the success of any program. There is a stigma attached to these activities that may be difficult to overcome. Even when the school systems do not hire teachers of agriculture to teach for 12 months, do they have a right to make the teacher feel less professional when he or she attempts to supplement their income with part-time employment? Furthermore, if they do engage in part-time employment, what will these teachers have to sacrifice in terms of personal time, public perception, or success of their agriculture programs?

Table 4

Perception of Problems Associated with Part-Time Employment by Secondary Agricultural Education Teachers

Problems	N	M	SD
Forces teachers to make judgments	63	3.14	0.5918
Conflict of interest - using agricultural education facilities	66	3.08	0.8285
Lack of time to spend with family	62	3.05	0.7773
Can become a second full-time job	66	2.97	0.7226
Time not available when the greatest need arises	62	2.95	0.7559
Lack of time to devote to FFA activities	61	2.79	0.9150
Lack of time to supervision of students	61	2.79	0.7553
Relationships with students - public relations problems	61	2.75	0.6989
Hinders lesson planning	60	2.75	0.7507
Lack of time to teach young-adult farmer classes	61	2.74	0.7506
Lack of time to attend in-service-professional activities	58	2.72	0.8542
Abuse of summer (extended) employment	65	2.72	0.8387
Emergencies must be handled regardless of school	64	2.70	0.8851
Alienation if teachers operate competing agribusiness	65	2.66	0.8154
Less contact with other staff and students in the school system	66	2.64	0.8159
Difficult to serve two masters	65	2.62	0.7436
Concern about time spent away from official duties	67	2.61	0.8157
Lack of time for advisory committee meetings	61	2.59	0.8441
Prevents doing both jobs well	64	2.58	0.9225
Cause teaching to become part-time employment	64	2.56	0.8706
Teacher not willing to provide community & industry services	64	2.56	0.8141
Problem - working for the school or for themselves	62	2.55	0.9175
Encourages part-time agricultural education programs	62	2.55	0.9526
Reduced teaching contracts for all agriculture teachers	63	2.54	0.8949
Public image problem - double dipping	63	2.49	0.8957
Competition with others seeking employment	57	2.49	0.7102
Conflict of interest - employing students	62	2.48	0.9708
Image of agricultural education - less important than other teaching areas	61	2.46	1.0095
Administrators question if SAE visits are real	66	2.44	0.7870
Causes a halt in FFA activities during the summer	67	2.43	0.8568
School administrators recognize programs as part- time	64	2.42	0.7726
Cause relationship problems with school officials	62	2.42	0.8208
Demonstrates that teaching is not a full time commitment	65	2.40	1.0428
Decline in the dedication to teaching	65	2.37	0.9112
Decrease importance of agriculture education	63	2.35	0.8455
Decline in the dedication to teaching	63	2.35	0.9186

Table 4 (continued)

Problems	N	M	SD
Poor community involvement by teacher	64	2.33	0.8176
Teacher loses broader perspective of agriculture	64	2.27	0.7610
Tarnishes the professional image of agricultural education teachers	62	2.19	0.8653
Results in a poor instructional program	60	2.17	0.8471
Teachers teach content of part-time employment	64	1.98	0.6545

Rating scale: 1-Strongly disagree, 2-Disagree, 3-Agree, 4-Strongly agree

Recommendations: Based on the results of this investigation the following recommendations are proposed by the researcher:

1. Further research should be conducted to determine how school administrators perceive the benefits and problems associated with part-time employment by agricultural educators.
2. Teaching contracts should be lengthened to include 12-month employment for every teacher of agriculture education so that student programs will be monitored year round and FFA programs will not suffer.
3. Educational experience compensatory incentives need to be provided to teachers involved in part-time employment such as continuing education requirements are mandatory for all teachers. As one teacher noted when asked about his views on part-time farming in particular, he stated "Part-time farming is very expensive and time-consuming inservice"

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Perceptions of the Benefits and Problems Associated With Part-Time Employment by Secondary Teachers of Agricultural Education -- *A Critique*

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The researchers are commended for expanding the body of knowledge about thorny employment and workplace issues. The introduction/theoretical framework was well written and develops a rationale for this line of inquiry. The purpose of this study was clear and is significant given the extensive restructuring and employment shifts occurring in society. This research sought answers to the perplexing issue of part-time employment for secondary agricultural education teachers.

Methodologically, the study followed good research procedures. A defensible sampling plan was used in that 69 of 108 teachers within 150 miles of Ripley, WV, responded. Over 60% of the teachers were on 12-month contracts. This is significant given the problem being investigated and the variation across the three states in the study. For example, 13 (81%) of the Kentucky teachers, 20 (66%) of the West Virginia teachers, and 9 (40%) of the Ohio teachers were on 12-month contracts. Philosophically, one could argue that employees on less than 12-month contracts have a right to be employed during their "off" months. But, in this study, most of the teachers were on 12-month contracts.

The findings are presented clearly, by state, to facilitate comparisons. Almost 60% of the teachers were employed part-time and half were employed in agriculture on a part-time basis. Perhaps the most intriquing question embedded in this study could not be answered without additional analyses, i.e., Do teachers who are on 12-month contracts also hold part-time employment? Based on the findings in Table 2, one can extrapolate an answer for two of the three states. For the Kentucky teachers, 13 of 16 were on 12-month contracts and 12 of the 16 held part-time positions. In West Virginia, 20 of the 30 teachers were on 12 months and 17 of the 30 had part-time positions. The Ohio data are less clear, but the 12-month teachers in Kentucky and West Virginia tended to have part-time employment, which raises the "so what?" question. The researchers reported that part-time employment results in 22 benefits, all of which the teachers perceived as positive. They also reported that the teachers agreed with 40 of the 41 negative items that teacher educators and supervisors said are tied to part-time employment. But, a close reading of Table 4 might suggest otherwise. First, only three of the 41 items achieved means above a 3.00 (agree). Second, assuming that 2.5 is the mid-point of their 4-point scale, how strongly did the teachers really agree that the items were problems? Table 4 lists 24 items with means ranging from 2.54 to 3.14 (means for the other 17 items ranged from 1.98 to 2.49).

Finally, the first recommendation seems in order because the perceptions of school administrators are needed on this issue. But, the other two recommendations do not appear to be supported by the findings as the researchers claim. They appear to be based on personal biases and somewhat unrealistic assumptions not consistent with today's employment laws. In total, this is an interesting study that will spark discussion and generate insights into this issue that some agricultural educators perceive to be more of a problem than do many segments of society.

ATTITUDES AND KNOWLEDGE OF BIOTECHNOLOGY BY WEST VIRGINIA AGRICULTURAL EDUCATION TEACHERS

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ATTITUDES AND KNOWLEDGE OF BIOTECHNOLOGY BY WEST VIRGINIA AGRICULTURAL EDUCATION TEACHERS

Abstract

Science related competencies, such as chemistry, biology, genetics, physiology, and zoology, have always been a part of the agricultural education curriculum. Rapidly evolving technologies in many of these areas have pressured agricultural educators to keep abreast of developments and create relevant curricula. Biotechnology is no exception. The purpose of this study was to provide information on the attitudes toward and knowledge level of biotechnology by West Virginia Agricultural Education teachers.

A descriptive research design was employed to collect data for the study. A research questionnaire was mailed to 95 agricultural education teachers in West Virginia during the 2000-2001 school year. The questionnaire included questions on the attitudes toward biotechnology, level of knowledge of biotechnology topics, and basic demographics characteristics of the participants.

A major finding of the study was that West Virginia agricultural education teachers possess a positive attitude towards biotechnology, but lack some of the resources and knowledge to incorporate the subject matter into their curriculum. Teachers perceive themselves as having more knowledge on biotechnology topics that have traditionally been associated with agriculture (animal reproduction, hybridization) and less knowledge on topics that are associated with other fields (environmental biotechnology, human genomics).

Introduction

Science related competencies have always been a part of the agricultural education curriculum. Concepts and principles of chemistry, biology, genetics, physiology, and zoology are readily applied to plant and animal studies (Moss, 1985). Martin (1989) stated that, " Although sciences pertinent to agriculture are being taught, we do not know to what extent they are being taught nor do we know what is being taught and what more should be taught related to the sciences of agriculture" (p. 244).

Agriscience, bioscience, and ag-technology are all buzzwords currently being used to reflect infusion of biotechnology and genetic engineering into the agricultural education curriculum. Biotechnology involves the biology and chemistry of living organisms at the cellular level. Genetic engineering involves the transferring of genes from one organism to another. Both are having major impacts on the agricultural industry and the consumers of agriculture in this nation (National Council on Vocational Education, 1990).

According to the National Council on Vocational Education, the concern for integrating more science and technology into the agricultural curriculum has been spurred by four movements: a) the national back-to-basics emphasis on math and science; b) the national study on agricultural education in the United States which indicated that "the subject matter about agriculture and in agriculture must be broadened," this said by the National Research Council; c) the expressed need by industry for employees to be able to solve problems and think more critically, and d) the rapid pace by which agriculture is changing as a result of technological advances (Kirby, 1990, p. 71). Smith as cited by Martin (1989) raised the following point:

> Many educators question what needs to be taught in the sciences related to agriculture. How much science should be taught in vocational agriculture programs? Is biotechnology likely to have an impact that would warrant a specialized curriculum effort? Should information on biotechnology be integrated into all aspects of the agriculture curricula? (p. 244)

Agricultural educators in West Virginia are faced with the challenge of teaching about developing technologies in agriculture. The need for more science electives being offered at the high school level has created the need for a versatile agricultural educator with strong preparation in, and knowledge of, science and agriculture. So that West Virginia agricultural educators will be prepared to deliver a more in-depth science curriculum to their students, it is important to assess the attitudes of West Virginia agricultural teachers, knowledge, and strategies for using agriculture as a means to convey these important science concepts and techniques.

Definition of Terms

1. Biotechnology - general term that refers to engineering living organisms on the cellular level.
2. Genetic engineering – changing the genetic information in a cell, resulting in a transgenic organism.

Limitations of the Study

This study was limited to West Virginia Agricultural Education teachers employed during the 2000-2001 school year.

Review of Literature

Rapidly evolving technologies have always pressured agricultural educators to keep abreast of developments and create relevant curricula. Biotechnology is no exception. Biotechnology is the procedures used to influence living things at the cellular level to produce commercial products. The techniques of biotechnology range from genetic engineering to fermentation, and they are among the most complex and widely applied innovations of our time. Biotechnology is already applied to agriculture in more ways than most of us suspect (Smith, 1989).

According to Lasley, "Biotechnology is a buzz word commonly heard in conversation today, but seldom understood beyond the realm of science. Yet biotechnology is being called agriculture's third wave, comparing it to machines replacing human labor and chemicals being introduced into agricultural production" (Martin, 1989, p. 243).

"Biotechnology with all its inherent complexities, mysteries, problems, and challenges, promises to revolutionize farming and agriculture. In addition, it is expected to become the major source of innovation for agriculture by the early 21st century", according to Hardy as cited by (Martin, 1989, p. 243).

According to Martin (1989),

> Biosciences such as plant science, animal science, genetics, microbiology, soil science, and food science provide the foundation for the growth and development of the industry

of agriculture. The application of biotechnology must be shared with students of agriculture in order to educate them regarding the occupation available in the field.

The study of biosciences paves the way for thorough preparation for students by laying down a strong foundation in the principles and concepts of science over which a super structure of agricultural biotechnology can be built in the years to come.(p. 243)

Martin (1989) goes on to say,

There exists a perception among some agriculture instructors that vocational agriculture students are not very interested in learning the biosciences related to agriculture. This finding might be attributed to the fact that the instructors were concerned that too much focus on the sciences of agriculture may hurt enrollment instead of enhance enrollment in agriculture programs. (p. 246)

According to Pool (1988),

The teachers who provide instruction in production agriculture only in today's classroom are lost and have surely signed the death warrant for their programs. Today's instruction must reflect what is coming in the future, not what has been in the past. Look at the students in our programs and find out how many are actually living on a production farm. I suggest that if the only students you have in your program are those interested in production agriculture, you have already lost sight of where you need to be. The curriculum of tomorrow's program must be inviting to those students who are interested in all fields of agriculture, including agricultural related business. (p. 9)

4-H leaders and agriculture education teachers are already introducing biotechnology to future farmers. Through the Carl Perkins Vocational Education Act, the United States Congress appropriated funds to help vocational students learn about new technologies. New curricula will likely emphasize career awareness because biotechnology is creating many unexpected opportunities. It will also emphasize the impact of biotechnology on the international agricultural economy. Other areas of emphasis are the impact of biotechnology on the environment, energy, and resource conservation (Smith, 1989).

Smith (1989), feels that,

The need to learn about biotechnology extends from high school students to legislators, and the gap between agriscience and agriculture is narrowing. Through genetic engineering, today's tobacco farm could become tomorrow's factory producing raw materials for pharmaceuticals. As a result, the education of tomorrow's agriculture worker will become more complex and more interesting. High school vocational agricultural courses could begin to hold more interest for academic students interested in biochemistry and genetics. (p. 11)

Purpose and Objectives

The purpose of the study was to provide information to the state supervisor of agricultural education and teacher educators that may be useful in modifying undergraduate course requirements and in planning in-service workshops and graduate courses to enhance teacher knowledge.

The primary objective of this study was to describe the attitudes of West Virginia agricultural education teachers toward and knowledge level of biotechnology. A secondary objective was to determine if there were relationships between selected demographic teacher variables and biotechnology attitudes and knowledge levels.

Research Questions

The following questions provided direction for the study:

1. What are the attitudes of West Virginia agricultural education teachers toward biotechnology?
2. What level of knowledge and understanding is demonstrated by West Virginia agricultural education teachers regarding biotechnology?
3. What relationships exist between selected teacher demographic variables and biotechnology attitudes and knowledge levels?

Methods/Procedures

A descriptive survey research method was used to collect data from high school agricultural education instructors in West Virginia. "Descriptive research is not generally directed toward hypothesis testing. The aim is to describe, "what exists" with respect to variables or conditions in a situation" (Ary, 1990, p. 381). It was the aim of this research to discover "what exists" among West Virginia agricultural education teachers in the areas of biotechnology.

"Descriptive surveys focus on determining the status of a defined population with respect to certain variables. They basically inquire into the status quo; they attempt to measure what exists without questioning why it exists" (Ary, 1990, p. 407). This design is appropriate for determining the knowledge level, attitudes, and implementation of the study population.

Population of the Study

The population for the study included the 95 agricultural education teachers from West Virginia during the 2000-2001 school year. The population frame was established from the 2000-2001 West Virginia Secondary Agriculture Teachers Directory.

Instrumentation

A survey was mailed to all agricultural education instructors in the state of West Virginia. The survey was organized into two major sections. Section I focused on the perceived level of knowledge in biotechnology and the attitudes that teachers possess on biotechnology issues and teaching biotechnology. The final section requested demographic information of the participants including: years of experience, highest degree held, ownership of a farm, and ownership of an agribusiness.

The questionnaire was constructed according to recommendations by Dillman (1978) and Sudman and Bradburn (1982). These include recommendations on question ordering and the color of the paper.

An existing study and instrument conducted by Kirby (1990) in North Carolina was modified for this investigation. The revised instrument was presented to a panel of experts consisting of teacher educators at West Virginia University to establish content and face validity.

A panel of experts, consisting of agricultural education teachers serving on the West Virginia Program and Policy committee, was used to pilot test the instrument. They were administered the questionnaire and the data were used to establish the instrument's reliability. Cronbach's alpha is the most widely used and appropriate reliability tool. The reliability of the instrument was found to be .9026.

Data Collection

Dillman's suggestions for constructing survey instruments, cover letters, and follow-up strategies were implemented (1978). A survey with cover letter was mailed to each of the agricultural education teachers in West Virginia. A stamped, self-addressed envelope was provided for return of the instrument. A follow-up letter was sent two weeks after the original to remind those who had not yet responded that their cooperation was essential.

Non-response error was examined by comparing late respondents to early respondents (Smith and Miller, 1983). Late respondents have been shown to be similar to non-respondents.

Analysis of Data

This study sought to measure the knowledge level, attitudes, and implementation of WV agricultural education teachers in the areas of biotechnology. Data collected were analyzed using SPSS at West Virginia University. Descriptive analyses were performed on the data, which are presented in narrative and tabular form. The following scale was used to describe the magnitude of relationship between variables (Davis, 1971).

Coefficient	Description
.70 or higher	Very strong association (relationship)
.50 to .69	Substantial association
.30 to .49	Moderate association
.10 to .29	Low association
.01 to .09	Negligible association

Results

Demographics of the Sample Group

Information was received from 62 teachers (65.3%). Of the teachers reporting, the mean for years taught was 16. When asked what was their highest degree earned the respondents indicated that 31 (50%) held a B.S. degree, 29 (46.8%) held a M.S. degree, and 1 (1.6%) held a Ph.D. Among the respondents, 40 (64.5%) operated a farm and 14 (22.6%) owned an agribusiness.

Biotechnology Level of Knowledge

West Virginia agricultural education teachers were asked to rate their knowledge level on eighteen topics of biotechnology. In all cases a score of 1 = no knowledge, 2 = heard about, but very little knowledge, 3 = read about, possess some knowledge, and 4 = applied, knowledgeable.

West Virginia agricultural education teachers perceived themselves as having only "heard about, but very little knowledge" on the topics of bioremediation, electrophoresis, human genomics, transgenic species, recombinant DNA, and microbial biotechnology. The teachers perceived themselves as having "read about, possess some knowledge" on the topics of gene splicing, environmental biotechnology, food biotechnology, genetic engineering, genetically modified food, cloning, biotechnology ethics, plant tissue culture, resistant plant species, hybridization, and growth hormones. Animal reproduction was the only biotechnology topic that West Virginia agricultural education teachers perceived themselves as having "applied, knowledgeable."

Table 1

Biotechnology Knowledge

			No Knowledge		Little Knowledge		Some Knowledge		Knowledge-able	
Topics	M	SD	f	%	f	%	f	%	f	%
Animal Reproduction	3.67	0.64	1	1.6	2	3.2	12	19.4	42	67.7
Growth Hormones (bST/pST)	3.14	0.81	2	3.2	9	14.5	26	41.9	21	33.9
Hybridization	3.02	0.94	5	8.1	9	14.5	23	37.1	20	32.3
Resistant plant species	3.00	0.77	2	3.2	11	17.7	30	48.4	15	24.2
Plant Tissue Culture	2.98	0.87	4	6.5	9	14.5	26	41.9	16	25.8
Biotechnology Ethics	2.93	0.73	1	1.6	14	22.6	30	48.4	12	19.4
Cloning	2.90	0.68	2	3.2	11	17.7	38	61.3	9	14.5
Genetically modified food	2.83	0.76	4	6.5	11	17.7	36	58.1	9	14.5
Genetic Engineering	2.81	0.71	2	3.2	15	24.2	34	54.8	8	12.9
Food Biotechnology	2.62	0.87	9	14.5	11	17.7	34	54.8	6	9.7
Environmental Biotech.	2.60	0.85	8	12.9	14	22.6	32	51.6	6	9.7
Gene Splicing	2.57	0.75	4	6.5	23	37.1	28	45.2	5	8.1
Microbial Biotechnology	2.41	0.94	11	17.7	19	30.6	21	33.9	7	11.3
Recombinant DNA	2.38	0.90	12	19.4	18	29.0	25	40.3	5	8.1
Transgenic species	2.16	0.83	12	19.4	26	41.9	15	24.2	3	4.8
Human Genomics	2.10	0.82	14	22.6	25	40.3	16	25.8	2	3.2
Electrophoresis	2.05	1.02	22	35.5	19	30.6	11	17.7	7	11.3
Bioremediation	1.67	0.80	30	48.4	22	35.5	6	9.7	2	3.2

Scale = 1=No knowledge, 2=Heard about, but very little knowledge, 3=Read about, possess some knowledge, 4=Applied, knowledgeable

A substantial relationship existed between operating a farm and the topic of growth hormones. Slightly more than half of the teachers responding who operated a farm perceived themselves as having "applied, knowledgeable" about the topic of growth hormones. A moderate relationship existed between operating an agribusiness and the topic of animal reproduction. Slightly more than 90% of the teachers who operated an agribusiness perceived themselves as having "applied, knowledgeable" on the topic of animal reproduction. A substantial relationship existed between highest degree held and the biotechnology topics of transgenic species, recombinant DNA, gene splicing, and electrophoresis. Agricultural education teachers with a master's degree or higher perceived themselves as more knowledgeable on the topics of recombinant DNA and electrophoresis than teachers with bachelors degrees. Those with bachelor's degrees perceived themselves as more knowledgeable on the topic of gene splicing than did those who possessed advanced degrees.

Table 2

Relationships Between Key Demographic Areas and Biotechnology Knowledge

Topics	Years Exp. (Kendall's tau-c)	Own Farm (Cramer's V)	Own Agribusiness (Cramer's V)	Degree Held (Cramer's V)
Recombinant DNA	0.05	0.27	0.14	0.52**
Bioremediation	0.02	0.25	0.41*	0.29
Gene Splicing	-0.06	0.07	0.21	0.52**
Genetic Engineering	0	0.21	0.16	0.42
Cloning	-0.11	0.14	0.13	0.41
Transgenic species	0.2	0.12	0.37	0.57**
Genetically Modified Food	-0.11	0.08	0.22	0.36
Electrophoresis	0.1	0.23	0.29	0.5*
Environmental Biotech.	0.16	0.19	0.33	0.41
Food Biotechnology	0.06	0.33*	0.29	0.44
Microbial Biotechnology	0.18	0.24	0.27	0.44
Hybridization	-0.17	0.3	0.31	0.3
Plant Tissue Culture	0	0.23	0.27	0.4
Resistant Plant Species	-0.13	0.27	0.22	0.18
Animal Reproduction	-0.15	0.24	0.38*	0.27
Growth Hormones (bST/pST)	-0.06	0.5**	0.14	0.28
Human Genomics	0.21*	0.35	0.25	0.17
Biotech. Ethics	0.07	0.33	0.33	0.3

* = significant at .05 level
** = significant at .01 level

Conclusions

Based upon the biotechnology level of knowledge that West Virginia agricultural education teachers reported, the following conclusions can be drawn:

- Teachers perceive themselves as having more knowledge on biotechnology topics that have traditionally been associated with agriculture (animal reproduction, hybridization) and less knowledge on topics that are associated with other fields (environmental biotechnology, human genomics).

- Teachers that operate a farm or agribusiness perceive themselves as more knowledgeable than those that do not on several biotechnology topics.

Attitudes toward Biotechnology

The attitudes possessed by West Virginia agricultural education teachers of biotechnology were divided into two sections. In the first section, teachers responded to ten biotechnology issue questions. In the second section, teachers responded to ten statements that were preceded by "It is my job to..." In all cases a 1 = strongly agree, 2 = agree, 3 = disagree, and 4 = strongly disagree.

In the first section, teachers agreed with almost all of the biotechnology statements. Teachers disagreed with two statements, "Crossbreeding to produce hybrids is morally wrong" and "Cloning living organisms is morally wrong." Teachers believed that biotechnology should be a class taught by agricultural education teachers and that it should be a topic in an agriscience class. A low relationship existed between years of experience and the statement, "Biotechnology should be a class taught by agricultural education teachers." Teachers with less experience (eleven years or less) agreed with this statement more than those with more experience (more than eleven years). A moderate relationship existed between operating a farm and the statement, "I support the use of genetic engineering of food crops." Nearly all of the teachers that did not operate a farm, agreed with this statement. A moderate relationship existed between operating an agribusiness and the statement, "Biotechnology should be a topic in an agriscience class." The entire group of teachers that operated an agribusiness, agreed with this statement. A substantial relationship existed between highest degree held and the statement, "Cloning living organisms is morally wrong." Nearly 90% of the teachers with a master's degree or higher did not feel that cloning was morally wrong.

In the second attitude section, teachers agreed that it was their job to do more than half of the biotechnology responsibilities. Teachers did not feel that it was their job to, distribute publications about biotechnology, sponsor meetings related to biotechnology, conduct biotechnology research, and develop publications about biotechnology. A moderate relationship existed between operating an agribusiness and the job of distributing publications about biotechnology and teaching high school students about biotechnology. Almost three-fourths of the teachers that operated an agribusiness believed it was their job to distribute publications about biotechnology and the entire group of agribusiness operating teachers believed it was their job to teach high school students about biotechnology. A moderate to substantial relationship existed between highest degree held and several biotechnology responsibilities. More than 60% of the teachers that held their master's degree or higher, did not feel that it was job to conduct biotechnology research, sponsor biotechnology-related meetings, or develop biotechnology publications. More than 50% of the teachers that held their bachelor's degree believed that it was their job to develop instructional materials and lesson plans on biotechnology and educate consumers about biotechnology.

Table 3

Attitudes Toward Biotechnology

Topics	M	SD	Strongly Agree f	Strongly Agree %	Agree f	Agree %	Disagree f	Disagree %	Strongly Disagree f	Strongly Disagree %
Cloning living organisms is morally wrong.	2.75	0.79	6	9.7	10	16.1	38	61.3	7	11.3
Cross breeding to produce hybrids is morally wrong.	3.13	0.97	4	6.5	13	21	16	25.8	29	46.8
I support the use of biotechnology for human medicine.	2.00	0.87	19	30.6	28	45.2	11	17.7	4	6.5
I support the genetic engineering of feed crops.	1.94	0.83	20	32.3	29	46.8	10	16.1	3	4.8
I support the genetic engineering of food crops.	2.03	0.83	17	27.4	29	46.8	13	21	3	4.8
I support the genetic engineering of animals.	2.19	0.81	12	19.4	29	46.8	18	29	3	4.8
I support the use of biotechnology for environmental purposes.	1.79	0.61	19	30.6	36	58.1	6	9.7	1	1.6
Biotechnology should be a class taught by AG-ED Teachers.	1.97	0.72	15	24.2	36	58.1	9	14.5	2	3.2
Biotechnology should be a topic in an agriscience class.	1.72	0.69	24	38.7	31	50	5	8.1	1	1.6
I believe that local, state, and federal money should be spent to enhance the teaching of biotechnology?	1.79	0.66	20	32.3	36	58.1	5	8.1	1	1.6

Scale = 1=Strongly agree, 2=Agree, 3=Disagree, 4=Strongly disagree

Conclusions

Based on the data collected from the West Virginia agricultural education teachers concerning their attitudes about biotechnology, the following conclusions can be drawn:

- Teachers support the use of biotechnology in today's world.
- Agricultural education teachers believe that they should teach biotechnology courses and topics.
- It is more likely that teachers with less experience will teach biotechnology.
- It is more likely that teachers that operate an agribusiness will teach biotechnology.

- Teachers believe more that a biotechnology responsibility applies to their job if it involves educating people and involving students.
- Teachers do not believe that biotechnology responsibility applies to their job if it involves outside activities that do not involve students and educating people.
- It is more likely that teachers that operate an agribusiness will perform biotechnology responsibilities that do not involve students and educating people.
- It is more likely that teachers with a bachelor's degree will perform more biotechnology responsibilities than those with a master's degree or higher.

Table 4

Relationships Between Key Demographic Areas and Biotechnology Attitude

Topics	Years Exp. (Kendall's tau-c)		Own Farm (Cramer's V)		Own Agribusiness (Cramer's V)		Degree Held (Cramer's V)	
Cloning living organisms is morally wrong.	0.11		0.07		0.14		0.55	**
Cross breeding to produce hybrids is morally wrong.	0.07		0.1		0.24		0.29	
I support the use of biotechnology for human medicine.	-0.07		0.06		0.18		0.3	
I support the genetic engineering of feed crops.	0.01		0.31		0.15		0.36	
I support the genetic engineering of food crops.	0.01		0.37	*	0.22		0.42	
I support the genetic engineering of animals.	-0.02		0.28		0.25		0.31	
I support the use of biotechnology for environmental purposes.	0.12		0.15		0.22		0.42	*
Biotechnology should be a class taught by AG-ED Teachers.	0.24	**	0.06		0.17		0.32	
Biotechnology should be a topic in an agriscience class.	0.14		0.22		0.44	**	0.26	
I believe that local, state, and federal money should be spent to enhance the teaching of biotechnology?	0.06		0.18		0.29		0.27	

* = significant at .05 level
** = significant at .01 level

Recommendations

In order to inform secondary agricultural educators and to improve secondary agriculture programs in West Virginia, the following recommendations are made to the West Virginia University Agricultural and Environmental Education faculty and the West Virginia Department of Education Agricultural Education staff based on the results of this study:

- This study needs to be replicated in its complete or modified form to teachers nationwide or regionally to determine if the findings differ significantly from those in this study.
- Offer support to high school agricultural education departments to implement biotechnology and other scientifically enhanced curriculum.
- Offer competitive grants for programs that want to implement biotechnology o topics into their curriculum.
- Offer more biotechnology classes and workshops for teachers.
- Offer incentives to agricultural education teachers for developing science enriched agriculture curriculum and for becoming certified to teach science.
- Continue to pursue statewide science credit for agricultural education.
- Change undergraduate requirements of agricultural education majors by adding more science courses leading to a double certification in agricultural education and science.

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Attitudes and Knowledge of Biotechnology
by West Virginia Agricultural Education Teachers -- *A Critique*

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The authors focused on a topic of keen interest to most agricultural educators. This paper is a companion to another one they are presenting in this session. Thus, duplicative comments will be limited when feasible. The authors provided a good introduction by summarizing some of the germane literature. However, this section could have been strengthened with more research published since 1990.

Methodologically, the study was sound in most respects. The authors did a census of West Virginia's 95 teachers (62 responded) with appropriate nonrespondent follow-up. Also, the authors presented an excellent reliability coefficient for their instrument (alpha of .90) which suggests that they measured one (1) construct. Yet in their paper, there appeared to be two constructs (knowledge of biotechnology and attitude toward biotechnology). Also, correlation coefficients were presented in Tables 2 and 4 for relationships between demographic variables and knowledge and attitude. Footnotes for Tables 1 and 3 indicate that the same 4-point scale was used for both knowledge and attitude. A close reading of the narrative, however, reveals that attitude toward biotechnology was perhaps measured on a 4-point strongly agree-strongly disagree scale. This aspect of the study needs more clarity and precision. One must question if the findings are as reliable as the .90 coefficient suggests.

The findings are presented in a clear and concise manner in most respects. The teachers perceived that they were quite knowledgeable of animal reproduction and somewhat knowledgeable of 7-8 other areas of biotechnology. Having a master's and owning a farm or agribusiness were the best explanations for the knowledge scores. However, given that these findings are merely teacher perceptions, one must question what knowledge levels would have surfaced if objective or performance-based measurements had been used. Regarding the other major variable, the teachers tended to have positive attitudes toward biotechnology. Yet, it was difficult to determine what variables explained their attitudes. The attitude variable appeared to be assessed with a negative scale (strongly agree=1 to strongly disagree=4), but it is not clear how the demographic variables were ordered. More precision is needed to explain the teachers' attitude. Finally, the recommendations need more thought. The first recommendation to replicate this study regionally or nationally is questionable. Did this study provide a credible and defensible indicator of what West Virginia teachers know about biotechnology? Yes -- if you trust the teachers' perspectives, but no -- from an objective or performance standpoint. Thus, is it prudent to recommend that teachers be offered more classes and workshops and that the undergraduate curriculum be changed based solely on what teachers think they know?

Overall, the study is interesting, generally well-written, and provides a fresh look at an emerging area. However, more precision and depth are needed because many aspects of biotechnology are controversial. Thus, it is essential that teachers have the cognitive knowledge and performance skills to address biotechnology in an educationally sound manner. Finally, the authors should proof future papers more thoroughly to not lower the quality of their writings.

ATTITUDES, KNOWLEDGE, AND IMPLEMENTATION OF AGRISCIENCE BY WEST VIRGINIA AGRICULTURAL EDUCATION TEACHERS

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Attitudes, Knowledge, and Implementation of Agriscience by West Virginia Agricultural Education Teachers

Abstract

The purpose of this study was to provide information on the attitudes toward and knowledge level of agriscience as well as activities conducted which demonstrate implementation of agriscience by West Virginia Agricultural Education teachers.

Data were collected via a questionnaire. Knowledge level and attitudes of agriscience were the major focus areas. Demographics of the subjects were also collected.

A major finding of the study was that West Virginia agricultural education teachers possess a positive attitude towards agriscience, but feel that agriscience classes should not be the only classes taught in an agricultural education program.

Introduction

Science related competencies have always been a part of the agricultural education curriculum. Concepts and principles of chemistry, biology, genetics, physiology, and zoology are readily applied to plant and animal studies (Moss, 1985). Martin (1989) stated that, " Although sciences pertinent to agriculture are being taught, we do not know to what extent they are being taught nor do we know what is being taught and what more should be taught related to the sciences of agriculture" (p. 244).

Agriscience, bioscience, and ag-technology are all buzzwords currently being used to reflect infusion of biotechnology and genetic engineering into the agricultural education curriculum. Biotechnology involves the biology and chemistry of living organisms at the cellular level. Genetic engineering involves the transferring of genes from one organism to another. Both are having major impacts on the agricultural industry and the consumers of agriculture in this nation (National Council on Vocational Education, 1990).

According to the National Council on Vocational Education, the concern for integrating more science and technology into the agricultural curriculum has been spurred by four movements: a) the national back-to-basics emphasis on math and science; b) the national study on agricultural education in the United States which indicated that "the subject matter about agriculture and in agriculture must be broadened," this said by the National Research Council; c) the expressed need by industry for employees to be able to solve problems and think more critically, and d) the rapid pace by which agriculture is changing as a result of technological advances (Kirby, 1990, p. 71). Smith as cited by Martin (1989) raised the following point:

> Many educators question what needs to be taught in the sciences related to agriculture. How much science should be taught in vocational agriculture programs? Is biotechnology likely to have an impact that would warrant a specialized curriculum effort? Should information on biotechnology be integrated into all aspects of the agriculture curricula? (p. 244)

Agricultural educators in West Virginia are faced with the challenge of teaching about developing technologies in agriculture. The need for more science electives being offered at the

high school level has created the need for a versatile agricultural educator with strong preparation in, and knowledge of, science and agriculture. So that West Virginia agricultural educators will be prepared to deliver a more in-depth science curriculum to their students, it is important to assess the attitudes of West Virginia agricultural teachers, knowledge, and strategies for using agriculture as a means to convey these important science concepts and techniques.

Purpose and Objectives

The purpose of the study was to provide information to the state supervisor of agricultural education and teacher educators that may be useful in modifying undergraduate course requirements and in planning in-service workshops and graduate courses to enhance teacher knowledge.

The primary objective of this study was to describe the attitudes of West Virginia agricultural education teachers toward and knowledge level of agriscience as well as activities that demonstrate implementation of agriscience. A secondary objective was to determine if there were relationships between selected demographic teacher variables and agriscience attitudes and knowledge levels.

Research Questions

The following questions provided direction for the study:

1. What are the attitudes of West Virginia agricultural education teachers toward agriscience?
2. What level of knowledge and understanding is demonstrated by West Virginia agricultural education teachers regarding agriscience?
3. What relationships exist between selected teacher demographic variables and agriscience attitudes and knowledge levels?

Review of Literature

Origins of Agriscience

The Smith-Hughes Act established secondary agriculture education in the United States in 1917. The act was designed to encourage states to promote and further develop programs of vocational education which otherwise might not be adequately provided in our state systems of education. This act provided for vocational education in agriculture, trades and industries, and homemaking (Phipps, 1988).

Before the passage of the Smith-Hughes Act of 1917, there was the Hatch Act of 1887.

> The Hatch Act gave American agriculture true experimentation and scientific research. There is a direct cause and effect line that can be drawn from the Hatch Act funded research findings and the establishment of the cooperative extension service that helped distribute such findings to the practitioner farmer. Can Hatch Act influence be found as directly with the early agricultural education movement? Was early agricultural education more scientifically based that the contemporary version? (Hillison, 1996, p. 8)

One of the significant national issues in agricultural education today is the role agriscience should play in middle school and high school curricula (National Research Council,

1988). "All students need an understanding of basic science concepts. Teaching science through agriculture would incorporate more agriculture into curricula while more effectively teaching science" (National Research Council, 1988, p. 11).

Hillison (1996) raises a few questions about agriscience: "Just where did this idea of agriscience come from? What has been the evolutionary development of the program? Does it fit into a basic vocational program? Is agriscience really more academic than vocational (p. 8)?

According to Hillison (1996), two years after the passage of Hatch Act, Chamber's Encyclopedia had a definition of agricultural education that showed thinking similar to the Act. The definition used for the field was:

> Agricultural Education, as at present understood, is a comprehensive term, including instruction in chemistry, geology, botany, zoology, mechanics embracing, in short the science as well as the practice of agriculture. However important branching off of education into this special track, it is only of late years that adequate attention has been paid to it. (p. 10)

Twenty-eight years after the Chamber's Encyclopedia definition of agricultural education, the Smith-Hughes Act had a different definition, according to Hillison (1996):

> ...any State shall provide in its plan for agricultural education that such education shall be that which is under public supervision or control; that the controlling purposes of such education shall be to fit for useful employment; that such education shall be of less than college grade and be designed to meet the needs of persons over fourteen years of age who have entered upon or who are preparing to enter upon the work of the farm or of the farm home. (p. 10)

"Obviously the Smith-Hughes Act shifted the definition of agricultural education from being science-based and academic-oriented to a strictly vocational definition (Hillison, 1996, p. 10).

Agriscience Today

Buriak, as cited by Dormady (1993, p. 63) defined agriscience as "instruction in agriculture emphasizing the principles, concepts, and laws of science and their mathematical relationships supporting, describing, and explaining agriculture."

> Ongoing efforts should be expanded and accelerated to upgrade the scientific and technical content of vocational agriculture courses. The "vocational" label should be avoided to help attract students with diverse interests, including college bound and those aspiring to professional and scientific careers in agriculture. Agricultural courses sufficiently upgraded in science content should be credited toward satisfying college entrance and high school graduation requirements for science courses in addition to the core curriculum.(National Research Council, 1988, p. 35)

Osborne (1993) states,

> And clearly, we must focus on redefining the place and role of agricultural education in the secondary schools. But at the same time, it would be a drastic mistake to throw away *everything* from the past and start from scratch. We should continue to teach technical skills, job skills, entrepreneurship, and leadership skills. We should continue to teach how to grow plants and raise animals. We should continue to teach agricultural mechanics.

> But we should teach these topics better by linking the practices of agriculture with the science of how plants and animals grow; how machines work; and why plants, animals, and materials respond to treatments as they do. The result will be a stronger agriculture curriculum, a student who makes better management decisions in plant and animal agriculture, and a student who has a working knowledge of science. The right kind of agriscience instruction will make the agriculture program stronger, while making a unique contribution to the scientific literacy of students in the school.(p. 3)

Methodology

Research Design

A descriptive survey research method was used to collect data from high school agricultural education instructors in West Virginia. "Descriptive research is not generally directed toward hypothesis testing. The aim is to describe, "what exists" with respect to variables or conditions in a situation" (Ary, 1990, p. 381). It is the aim of this research to discover "what exists" among West Virginia agricultural education teachers in the areas of biotechnology and agriscience.

"Descriptive surveys focus on determining the status of a defined population with respect to certain variables. They basically inquire into the status quo; they attempt to measure what exists without questioning why it exists" (Ary, 1990, p. 407). This design is appropriate for determining the knowledge level, attitudes, and implementation of the study population.

Population of the Study

The population for the study included the 95 agricultural education teachers from West Virginia during the 2000-2001 school year. The population frame was established from the 2000-2001 West Virginia Secondary Agriculture Teachers Directory.

Instrumentation

A survey was mailed to all agricultural education instructors in the state of West Virginia.

The survey was organized into three major sections. Section II focused on agriscience and consisted of three parts. The perceived level of knowledge and teaching methods used in agriscience and the level of knowledge that teachers possess about general science subjects made up the first first part. The attitudes that teachers possess on agriscience issues and teaching agriscience made up the second part. The third part of this section rated the implementation of agriscience looking at barriers and how teachers gather information.

Section III requested demographic information including: years of experience, highest degree held, ownership of a farm, and ownership of an agribusiness.

The questionnaire was constructed according to recommendations by Dillman (1978) and Sudman and Bradurn (1982). These include recommendations on question ordering and the color of the paper.

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Non-response was examined by comparing late respondents to early respondents (Smith and Miller, 1983). Late respondents have been shown to be similar to non-respondents.

Analysis of Data

This study sought to measure the knowledge level and attitudes of WV agricultural education teachers in the area of agriscience. Data collected were analyzed using SPSS at West Virginia University. Descriptive analyses were performed on the data, which are presented in narrative and tabular form.

The following scale was used to describe the magnitude of relationship between variables (Davis, 1971).

Coefficient	Description
.70 or higher	Very strong association (relationship)
.50 to .69	Substantial association
.30 to .49	Moderate association
.10 to .29	Low association
.01 to .09	Negligible association

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary and Conclusions of Knowledge of Agriscience

West Virginia agricultural education teachers were asked to rate their knowledge level on twelve topics of agriscience. In all cases a score of 1 = no knowledge, 2 = heard about, but very little knowledge, 3 = read about, possess some knowledge, and 4 = applied, knowledgeable.

Teachers perceived themselves having "read about, possess some knowledge", about the topics of plant pathology, food science, hydroponics, aquaculture, environmental science, and forestry science. Teachers perceived themselves as "applied, knowledgeable" about the topics of crop science, botany/plant science, agriculture mechanics/engineering, horticulture, animal and vet science, and soil science. The topic of soil science had nearly 90% of the teachers perceiving themselves as knowledgeable. A low relationship existed between years of experience and the

agriscience areas of botany/plant science and environmental science. Three-fourths of the teachers with more teaching experience perceived themselves as more knowledgeable about botany and plant science. Almost two-thirds of the teachers with more teaching experience perceived themselves as more knowledgeable in the area of environmental science. A moderate relationship existed between operating an agribusiness and the topic of forestry science. A little more than three-fourths of the teachers that operated an agribusiness perceived themselves as more knowledgeable about this topic.

Conclusions

Based on the information provided by West Virginia agricultural education teachers in the area of knowledge level of agriscience, the following conclusions can be drawn:

- Teachers perceive themselves as knowledgeable about agriscience.
- It is more likely that teachers with more teaching experience are more knowledgeable about several agriscience topics.

Table 1

Agriscience Knowledge

			No Knowledge		Little Knowledge		Some Knowledge		Knowledgeable	
Topics	M	SD	f	%	f	%	f	%	f	%
Soil Science	3.87	0.34	0	0	4	6.5	13	21	43	69.4
Animal and Vet Science	3.75	0.43	0	0	15	24.2	0	0	46	74.2
Horticulture	3.72	0.49	0	0	10	16.1	19	30.6	31	50
Agriculture Engineering /Mechanics	3.65	0.61	0	0	2	3.2	19	30.6	40	64.5
Botany/Plant Science	3.62	0.55	0	0	2	3.2	19	30.6	39	62.9
Crop Science	3.62	0.56	0	0	6	9.7	23	37.1	30	48.4
Forestry Science	3.48	0.65	0	0	9	14.5	25	40.3	25	40.3
Environmental Science	3.41	0.67	0	0	5	8.1	22	35.5	34	54.8
Aquaculture	3.35	0.76	0	0	1	1.6	15	24.2	44	71.0
Hydroponics	3.27	0.8	1	1.6	10	16.1	21	33.9	28	45.2
Food Science	3.27	0.72	1	1.6	14	22.6	24	38.7	21	33.9
Plant Pathology	3.08	0.81	0	0	0	0	8	12.9	53	85.5

Scale: 1=No knowledge; 2=Heard about, but very little knowledge;
3=Read about, possess some knowledge; 4=Applied, knowledgeable.

Table 2
Relationships Between Demographic Variables and Agriscience Knowledge

Topics	Years Exp. (Kendall's tau-c)	Own Farm (Cramer's V)	Own Agribusiness (Cramer's V)	Degree Held (Cramer's V)
Soil Science	0.13	-0.18	0.08	0.06
Botany/Plant Science	0.21*	0.07	0.15	0.2
Hydroponics	0.12	0.14	0.26	0.28
Aquaculture	0.13	0.12	0.14	0.17
Animal and Vet Science	0.2	-0.01	0.02	0.12
Forestry Science	0.02	0.18	0.32*	0.19
Environmental Science	0.25*	0.3	0.22	0.18
Agriculture Engineering/Mechanics	-0.02	0.25	0.18	0.27
Food Science	0.17	0.33*	0.25	0.23
Plant Pathology	0.17	0.19	0.32	0.24
Horticulture	0.03	0.14	0.3	0.16
Crop Science	0.11	0.19	0.2	0.27

*=Significant at .05 level

Summary and Conclusion of Attitudes Toward Agriscience

The attitudes possessed by West Virginia agricultural education teachers of agriscience were divided into two sections. In the first section, teachers responded to seven agriscience issue questions. In the second section, teachers responded to ten statements that were preceded by "It is my job to..." In all cases a 1 = strongly agree, 2 = agree, 3 = disagree, and 4 = strongly disagree.

In the first section, teachers agreed with every agriscience statement with the exception of one. Teachers did not agree with the statement, "WV agriculture education programs should teach only agriscience courses."

In the second section of agriscience attitudes, teachers strongly agreed it was their job to teach high school students about agriscience, to involve students in agriscience related SAEs, and to develop instructional materials and lesson plans on agriscience. The teachers agreed it was their job to do all but one of the agriscience responsibilities. Teachers disagreed that it was their job to develop publications about agriscience. A moderate relationship existed between operating a farm and the responsibility of conducting agriscience research and developing publications about agriscience. Slightly more than half of the teachers that operated a farm agreed that it was their job to conduct agriscience research, but almost two-thirds did not agree that it was their job to develop publications about agriscience.

Conclusions

Based on the information provided by West Virginia agricultural education teachers on their attitudes toward agriscience, the following conclusions can be drawn:

- Teachers do not feel that agriscience courses should be the only courses taught in an agricultural education program.
- It is unlikely that teachers will develop publications about agriscience.

Table 3
Attitudes Towards Agriscience

			Strongly Agree		Agree		Disagree		Strongly Disagree	
Topics	M	SD	f	%	f	%	f	%	f	%
WV agriculture education programs should teach only agriscience courses.	3	0.84	5	8.1	6	9.7	33	53.2	16	25.8
Agriscience courses are equally enriched with science concepts across WV.	2.02	0.96	21	33.9	21	33.9	12	19.4	5	8.1
WV agriculture education teachers should be dual certified in science and AgEd.	1.86	0.82	23	37.1	22	35.5	13	21	1	1.6
Agriscience should be taught at the middle school level.	1.7	0.77	28	45.2	23	37.1	8	12.9	1	1.6
WV agriscience courses should receive science credit.	1.58	0.62	28	45.2	29	46.8	1	1.6	1	1.6
WV agriculture education teachers should have the option to be dual certified in science and AgEd.	1.46	0.6	34	54.8	24	38.7	0	0	1	1.6
All WV agriculture programs should teach agriscience courses.	1.38	0.61	41	66.1	15	24.2	4	6.5	0	0

Scale: 1=Strongly Agree; 2=Agree; 3=Disagree; 4=Strongly Disagree

Table 4
Relationship Between Demographic Variables and Attitude towards Agriscience

	Years Exp. (Kendall's tau-c)	Own Farm (Cramer's V)	Own Agribusiness (Cramer's V)	Degree Held (Cramer's V)	
All WV agriculture education programs should teach agriscience courses.	0.05	0.1	0.2	0.24	
Agriscience should be taught at the middle school level.	0.01	0.33	0.22	0.22	
WV agriculture education programs should teach only agriscience courses.	-0.25**	0.18	0.25	0.53	**
WV agriscience courses should receive science credit.	-0.03	0.14	0.27	0.29	
Agriscience courses are equally enriched with science concepts across WV.	0.02	0.16	0.19	0.28	
WV agriculture education teachers should be dual certified in science and AgEd.	-0.14	0.26	0.35	0.28	
WV agriculture education teachers should have the option to be dual certified in science and AgEd.	-0.02	0.11	0.14	0.20	

*=Significant at .05 Level
**=Significant at .01 Level

Recommendations

In order to inform secondary agricultural educators and to improve secondary agriculture programs in West Virginia, the following recommendations are made to the West Virginia University Agricultural and Environmental Education faculty and the West Virginia Department of Education Agricultural Education staff based on the results of this study:

- This study needs to be replicated in its complete or modified form to teachers nationwide or regionally to determine if the findings differ significantly from those in this study.
- Offer support to high school agricultural education departments to implement scientifically enhanced curriculum.
- Offer competitive grants for programs that want to implement agriscience topics into their curriculum.
- Offer incentives to agricultural education teachers for developing science enriched agriculture curriculum and for becoming certified to teach science.

- Continue to pursue statewide science credit for agricultural education.
- Change undergraduate requirements of agricultural education majors by adding more science courses leading to a double certification in agricultural education and science.

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Attitudes, Knowledge, and Implementation of Agriscience by West Virginia Agricultural Education Teachers -- *A Critique*

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The integration of more science into secondary agricultural education curricula has been at the forefront of the profession since the 1980s when *A Nation at Risk*, *Understanding Agriculture*, and related studies led to major educational reforms. Agricultural educators responded to these studies with initiatives to incorporate more science into the curriculum. This quest for more science-based instruction has continued into the 21st century as evident by this paper which is a companion to another one the authors are presenting. Given the similarities of the two papers, duplicative comments will be limited where feasible.

A good introduction for the paper included much of the current literature from which the problem evolved clearly. From a methodological standpoint, the study was sound in most respects. The authors did a census of West Virginia's 95 agricultural education teachers (62 responded) with appropriate nonrespondent follow-up. Also, the authors presented an excellent reliability coefficient for their instrument (alpha of .90) which suggests that they measured one (1) construct. Yet in their paper, there appeared to be two constructs (knowledge of agriscience and attitude toward agriscience). Also, correlation coefficients were presented in Tables 2 and 4 for relationships between demographic variables and knowledge and attitude. Footnotes for Tables 1 and 3 indicate that two different 4-point scales were used to assess knowledge and attitude. This aspect of the study needs more clarity and precision. Consequently, one must question if the findings are as reliable as the .90 coefficient suggests.

The findings are presented in a clear, concise manner in most respects. The teachers perceived that they were knowledgeable of all areas of agriscience included in the study. However, few demographic variables explained their knowledge levels. As was the case with the other paper, one must question what knowledge levels would have surfaced if objective or performance-based measurements had been used. In addition, the teachers tended to have somewhat mixed and perplexing attitudes toward agriscience. Also, few of the demographic variables explained the teachers' attitude toward agriscience. Finally, comments about the recommendations in the other paper are germane here. The first recommendation to replicate this study regionally or nationally is questionable. Did this study provide a credible and defensible indicator of what West Virginia teachers know about agriscience? Yes -- if you trust teacher perceptions, but no -- from an objective or performance standpoint. Thus, is it sound to implement major programmatic recommendations based solely on what teachers think they know?

Overall, the study is interesting and provides a fresh look at this area. However, more precision and depth are needed. It is essential that teachers have the cognitive knowledge and performance skills to address agriscience in an educationally sound manner. Also, the authors should proof future papers more thoroughly to not lower the quality of their writings.

NORTH CAROLINA HOME SCHOOL PROVIDERS' PERCEPTIONS OF AGRICULTURAL EDUCATION

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NORTH CAROLINA HOME SCHOOL PROVIDERS' PERCEPTIONS OF AGRICULTURAL EDUCATION

Abstract

The purpose of this study was to determine (a) the level of interest of home school providers towards agricultural education, including Supervised Agricultural Experience programs and FFA, (b) what potential resources would be needed for instruction, and (c) whether interest of home school providers toward agricultural courses was based upon the home school being located in a rural, suburban, or urban location.

Data were collected by using a mailed questionnaire sent to 500 home education providers in nine counties throughout North Carolina. The counties were selected based upon classification as a rural, suburban, or urban county. Data were analyzed utilizing descriptive statistics. It was concluded that home school providers were interested in agricultural courses, such as horticulture, and would be interested in teaching resources such as a textbook. Home education providers were potentially interested in FFA membership and participation. This study also found that supervised agricultural experience programs were of interest to home school providers. There was no difference among home school providers in rural, suburban, and urban locations in interest level in of providing agricultural courses for their students.

INTRODUCTION/THEORETICAL FRAMEWORK

Should all students be given the opportunity to learn about the food, fiber and natural resource systems? If the answer is yes, the question that remains is whether non-public school educated students should be provided opportunities to enroll in agricultural courses, have active membership in the National FFA Organization, and participate in supervised agricultural experience programs.

It is estimated that there are 1.5 million children home schooled across the country (Kantrowitz and Wingert, 1999). According to Orsi (1998), home schools are one of the fastest growing segments within education. With a growth rate of nearly 15% per year, home education will need new educational opportunities for students (Orsi, 1998). Lines (1999) noted that, according to the United States Department of Education, home education has seen tremendous growth during the past decade and is not expected to slow.

Reasons why parents choose home schools for their children are various, depending upon the family and student needs. Rust and Reed (1980) believed that home school parents were dissatisfied with state-controlled schools. However, according to Koetzsch (1997), the most common reason that families choose home education was for religious-based instruction. Linden (1983) found that home education was important for families who wished to shield their children from negative influences of the public schools. Williams (1984) found that parents choose home education because of: unsuitability of the child for school, desire to control the learning process,

socialization, control of the content taught, and personal interest. Headley (1998) stated that home education was advantageous for families because it permitted parents to establish and control curriculum, the educational process and values that their children would be exposed to while attending school. With the increase of school violence within the public education system, more parents view home education is a safe alternative to the public schools (Koetzech, 1997).

Unlike the public school system, there is no universal curriculum used by home school providers. According to Ray (1997), over 70% of home school parents customize the curriculum for their children. This allows the parents to adjust the curriculum to best suit the child's interest or family lifestyle. Schemmer (1985) found great variety in the curriculum used, and that most home school providers used curriculum produced by commercial publishers. Mattingly's (1990) study of home schools in Kentucky and Indiana concluded that most curriculum used by home schools was commercially-prepared, self-paced programs. Mattingly concluded that home school providers purchase instructional material at home-schooling training seminars and teacher supply retailers and extensively relied on textbooks from public school suppliers.

With the increasing role of online technologies, many home school providers have begun to use online courses for complete or supplementary instruction (Zehr, 1999). Home educators have also begun to look at the public school system in providing services to their students. In Idaho, a system of dual-enrollment allows students from home and private schools to have access to public schools for a portion of the day (Diegmueller, 1995). Holt (1983) believed that home schools and public schools should cooperate and provide opportunities for home schools students to come for partial days, use public school facilities, and attend specialty course such as band and home economics.

Frick and Brennan (1998) noted that home educators could benefit from instructional materials and learning activities offered through agricultural education courses. Agricultural education materials could be combined with "hands-on" learning opportunities and supervised agricultural experience programs to provide work-based learning opportunities, and FFA activities would provide home education with activities that link classroom instruction and the application of skills (Frick and Brennan 1998).

A variety of courses in North Carolina are listed among the Agricultural Education Course descriptions that could be suitable for students who are home educated. The potential courses are as follows: (1) Agricultural Production and Management, (2) Agriscience Applications, (3) Animal Science, (4) Environmental and Natural Resources Studies, (5) Exploring Biotechnology, and (6) Horticulture.

The integration of classroom instruction, supervised agricultural experience programs and FFA membership within home education is a relatively new inquiry in the agricultural education profession. Because of the brevity of research conducted within home education, the "knowledge gap" of a potential relationship of agricultural education and home education is quite profound. Archer (1999) suggested that although home education continues to grow, many researchers have avoided the topic. Sampling problems, risk of being labeled an advocate or opponent, and lack of funding are reasons that home education still remains, in many regards, a mystery to many educational researchers (Archer, 1999).

Home education providers try to encourage their children to participate in leadership and social development activities ranging from religious based organizations to Scouts. Wingenbach and Kahler (1997) addressed the issue of perceived advanced youth leadership and life skills in their study. From their investigations, they found that leadership and life skills development were defined as skills in communications, decision making, interpersonal relationships, learning, resource management, understanding self, and working with groups (Wingenbach and Kahler, 1997). These concepts were deemed as important qualities that were derived from FFA leadership and personal development activities. Dormody and Seevers (1994) believed that students should join FFA and participate in leadership activities regardless of self-esteem, age, ethnicity or place of residence. Scanlon, Yoder, Hoover and Johnson (1989) examined the factors that impacted a student's decision to join FFA. Students listed the development of leadership and communication skills as the most common reasons for joining FFA.

The purpose of the SAE program, in conjunction with classroom instruction and FFA activities, is to develop skills, concepts and values needed to work in the agricultural industry (Rawls, 1982). Rawls found that parents perceive the benefits from SAE's were the positive development of work attitudes, occupational development, and human relation skills. Pals (1988) examined the value of supervised experience programs as perceived by students of agricultural education programs and found that students believed they benefited from SAE by, developing responsibility, developing interest in agriculture, learning to keep records, and making class subjects and content practical.

PURPOSE

The purpose of this study is to determine if home school providers are interested in providing agricultural education, FFA membership and supervised agricultural experience programs participation to home educated students. The following research questions were addressed:

1. What is the interest level of home school educators towards agricultural related course subjects, and what potential resources would be needed for instruction?
2. What is the interest of home school educators in student participation in a Supervised Agricultural Experience program, and what potential resources would be needed?
3. What is the interest of home school educators in National FFA Organization membership and participation for their students?
4. Are the interests of home school educators in providing the agricultural courses different, based upon the school being located within a rural, suburban, or urban environment?

METHODS/PROCEDURES

The research methodology used in this study is an example of descriptive research. Gall, Borg & Gall (1996) describe this type of inquiry as, "a type of research that measures the characteristics of a sample or population on pre-specified variables." Through survey research methods, home school providers in nine counties throughout North Carolina were contacted.

The population consisted of home school providers throughout North Carolina teaching students between the ages of 13-18. The population of home school providers is unknown however, it is estimated that 4,000 to 5,000 students between ages 13-18 are currently being educated at home. The sample consisted of home school providers in western, central and eastern North Carolina counties in order to represent the geographic diversity of the state. The sample was also chosen to incorporate home school providers within rural, urban and suburban counties. Proportional sampling was used for determining the sample size of home school providers within nine counties throughout the state. The sample size was 500 home school providers. The sample was selected from a rural, suburban, and urban county in the western, central, and eastern part of the state.

A questionnaire was developed by the researcher to identify the interest of home school providers in offering agricultural education and the resources needed for instruction and full participation in the agricultural education program. Content validity was assessed by a panel consisting of agricultural education faculty at North Carolina State University, the State Agricultural Education Coordinator, and the State FFA Coordinator. Reliability of the scaled items were assessed from data obtained in a pilot test of the instrument. The coefficient of internal consistency was $\alpha = .74$. The first section of the questionnaire addressed the age level of the home school student and population demographics of the location of the school. If home school providers indicated that the school taught students in the age level of 13 – 14, or age level of 15 or higher, all sections of the questionnaire were relevant to the inquiry. If the respondent did not teach a child at least 13 years of age, they were instructed not to complete the questionnaire and simply return it to the researcher.

The next section evaluated the interests of home school providers towards agricultural education. Respondents were asked if adequate resources and materials were available to home school providers, would they teach agricultural courses in their home school. Participants indicated interest by responding "yes", "no" or "perhaps." After the completion of this portion of the questionnaire, those respondents who indicated "no" were instructed to complete a section of the instrument that served to identify reasons that they were not interested in teaching agricultural courses. If the participants indicated an interest in teaching agricultural courses or indicated "perhaps" interested, those parents, using a Likert-scale, identified agricultural content areas they would be interested in teaching. Content areas included agriscience, agricultural production and management, animal science, biotechnology, environmental and natural resources, and horticulture. Using a Likert-type scale, home school providers addressed the types of resources needed to successfully teach agriculture.

Respondents also were also asked to indicate their interest in providing FFA membership to their students by choosing, "yes", "no", or "perhaps." Participants who indicated "yes" or "perhaps" evaluated various FFA activities, career development events, and personal development opportunities.

Interest in supervised agricultural experience programs and those resources needed for home school educators to effectively provide a SAE program was evaluated in the next section. Respondents were asked to indicate their interest in providing supervised agricultural experience

programs to their students. Response choices were, again, "yes", "no", or "perhaps." Using the scale of 0-3, home school providers indicated their interest in providing SAE programs for their students. Items included in this section described the major SAE areas. The final section of the questionnaire asked providers to evaluate the resources that would be needed to effectively incorporate supervised agricultural experience programs within the home school.

A total of 187 responses were received after two mailings of the questionnaire to the target population. This represented a response rate of 37.4%. While this response rate is relatively low, it is considered very acceptable for market research to a general population. To control for potential nonresponse error, data from early and late respondents were compared (Miller and Smith, 1983). No significant differences were found between early and late respondents for the major variables in the study.

Descriptive statistics including frequencies and percentages were used to assess the interest of home school providers in offering agricultural education, National FFA Organization activities, and supervised agricultural experience opportunities. In order to determine difference levels of interest of home school providers based upon location (rural, urban, suburban), analyses of variance techniques were used with a Fisher's LSD post hoc test.

RESULTS

In determining the interest levels of home school providers toward agricultural education, the study first addressed the age level of the children being taught at the home school. Home school providers indicated the age of their students in one of three categories. The categories were: ages 5-12, ages 13-14, or ages 15 and older. Slightly over half (51%) of all respondents indicated they were teaching students in the age demographic eligible for secondary agricultural education in the public school system.

When asked to evaluate interest of teaching agricultural courses, "yes", "no," and "perhaps,"" statements were used. While 23% of respondents indicated "no," they were not interested in teaching agricultural courses, 77% of respondents indicated some level of interest in teaching agricultural courses. Those respondents who indicated "no" to the question of interest in teaching agriculture were asked to complete a section which contained items to evaluate why agricultural courses would not be of interest. Nearly 78% of those respondents who responded "no" indicated that their student had no interest in agriculture. Over 60% of the respondents selected the statement that they did not have the skills or knowledge to teach agriculture.

Assessing the types of courses that home school providers would offer was also evaluated using the following Likert-scale: 0 = no opinion, 1 = disinterested, 2 = perhaps interested, 3 = highly interested. As shown in Table 1, home school providers reported the most interest in the horticulture course ($\underline{M}$ = 2.75). Almost 75% of the respondents who were interested in agriculture courses indicated a high interest in horticulture courses. Mean scores also indicated that animal science ($\underline{M}$ = 2.52) and environmental and natural resources studies ($\underline{M}$ =2.50) were also appealing to home educators (see Table 1). Over half of the respondents reported a high interest in offering these agriculture courses to home school students.

Table 1
Interest Levels of Home School Providers Towards Agricultural Courses

Agricultural Course	M	SD
Horticulture	2.75	0.42
Animal Science	2.52	0.59
Environmental and Natural Resources	2.50	0.63
Agricultural Production & Management	2.38	0.58
Biotechnology	2.31	0.74
Agriscience Applications	2.16	0.61

Note. 0 = no opinion; 1= disinterested; 2= perhaps interested; 3= highly interested

Home school educators were asked to identify resources that would be beneficial in teaching agriculture. Data are presented in Table 2. Again using a 0 – 3 Likert scale, school providers indicated that a textbook and student workbook would be useful for home schools (M = 2.7). Nearly seventy-three percent of respondents indicated that a textbook and student workbook would be "very important or needed in teaching agriculture." Also listed as important by over 60% of the respondents were the availability of a resource person in agricultural education and the use of laboratory facilities and/or greenhouses. Only 35% of the respondents felt on-line courses in agriculture were important resources needed to provide agricultural education to home school students.

Table 2
Possible Teaching Resources in Agricultural Education by Home School Providers

Teaching Resource	M	SD
Textbook and student workbook	2.70	0.52
Resource person in agricultural education	2.60	0.52
Use of laboratory facilities and greenhouses	2.59	0.52
Resources from NCSU and NC A&T	2.52	0.60
Instructional packets including videos	2.40	0.64
CD-Rom with learning activities	2.30	0.70
Training on how to teach agriculture	2.31	0.60
On-line agricultural course	2.26	0.62
Course blueprints	2.23	0.74
Test banks for each subject	2.11	0.84

Note. 1 = would not be important or needed to teach agriculture; 2 = would be of somewhat importance or somewhat needed; 3 = would be very important or needed.

An evaluation of interest in FFA membership and participation was also studied. Participants were asked, "Would your home school student(s) be interested in FFA membership

and participating in FFA activities and events?" Respondents were given the following choices: "yes," "no," or "perhaps." A majority of respondents (60.3%) indicated "perhaps." There were 27.4% who indicated "yes," the student(s) at their home school would be interested in the National FFA Organization, and 12.3% did not believe that their student(s) would be interested in FFA activities.

Those respondents who indicated "yes" or "perhaps" were asked to evaluate FFA activities again using the 0-3 scale (Table 3). Horticulture or plant science contest was identified using mean scores (M = 2.12) as one FFA activity that may be of interest to home school students. This is consistent with the interest in offering horticulture courses. While only 30% of the respondents reported they were "very interested" in plant science and horticulture contests, another 39% expressed some interest in these activities. Home school providers did not express high levels of interest in FFA leadership activities such as attending FFA conventions (6.8%), parliamentary procedure contests (3.7%), or having their student serve as an FFA officer (2.7%).

Table 3
Interest in FFA Activities by Home School Providers

FFA Activities	M	SD
Plant science/horticulture contests	2.12	0.74
Livestock judging contest	1.89	0.79
Summer recreational camp	1.89	0.71
Agriscience fairs	1.88	0.73
International travel	1.83	0.84
Public Speaking contest	1.80	0.82
Student leadership conferences	1.71	0.75
National FFA Convention	1.57	0.64
Parliamentary procedure contests	1.42	0.69
Serving as a FFA officer	1.32	0.57

Note. 0 = need more information about this activity; 1 = not interested in this FFA activity; 2 = perhaps interested in this FFA activity; 3 = very interested in this FFA activity

The third component of this study addressed the interest level of home school providers towards supervised agricultural experience programs. Participants were asked if their student would be interested in the SAE program and respondent with "yes." "no," and "perhaps," statements. Of the respondents, 49.3% indicated "yes" they were interested in supervised agricultural experience. An additional 47% indicated they were perhaps interested and 4% did not express interest in SAE's.

Respondents evaluated six major types of SAE programs using the 0 –3 scale (see Table 4). Mean scores indicated that supervised agricultural experience placement programs were most appealing (M = 2.41). Nearly 50% of respondents indicated that placement programs were the types of SAE's that were of most interest. In addition, 44.4% indicated high levels of interest in providing experimental SAE programs for their students. Only 17.6% of the respondents were interested in entrepreneurial (ownership) SAE programs.

Table 4
Means and Standard Deviations of Items for the Evaluation of Interest in Supervised Agricultural Experience Programs

Type of SAE Program	M	SD
Placement programs	2.41	0.67
Agricultural experiments	2.37	0.66
Job shadowing	2.28	0.66
Analytical programs	2.27	0.63
Home/community improvement	2.02	0.70
Entrepreneurial programs	2.01	0.65

Note. 0 = need more information about this SAE activity; 1 = not interested in this SAE activity; 2 = perhaps interested in this SAE activity; 3 = very interested

Home school providers also indicated the type of resources they believed would be useful for the inclusion of SAE in the home school (see Table 5). Mean scores indicate that a resource person in agricultural education, used to answer questions about supervised agricultural experience programs, would be the most useful (M = 2.72). Over 68% of home school educators indicated the importance of having a resource person for SAE implementation. Workshops were also seen as very useful by 53.4% of the respondents, followed by on-line SAE resources (46.8%) and information on recognition programs in FFA (45.2%).

Table 5
Mean Scores and Standard Deviations for Items Evaluating SAE Resources

Item	M	SD
Resource person	2.72	0.49
Training workshop and conferences	2.51	0.61
On-line resources	2.45	0.64
Information on job shadowing	2.40	0.66
Information on FFA recognition	2.38	0.70
Entrepreneurial activities and rules	2.35	0.70
Information on record keeping	2.29	0.65
Information on SAE's student benefits	2.25	0.73
Proficiency award workbooks	2.22	0.76
Agricultural placement rules and regulations	2.17	0.68

Note. 0 = not interested in SAE; 1 = not useful; 2 = somewhat useful; 3 = very useful

Does the interest of home school providers toward offering agricultural education depend upon the location of the home school? The final research question addresses this issue. Home schools where identified as being located in a rural, suburban or urban area. Of the respondents, 40% where located in a rural area, 37% where located in a suburban area, and 23% in an urban area of the state.

To evaluate if a difference of interest was present based upon yes/no/perhaps response among respondents in rural, suburban, and urban home schools, a Kruskal-Wallis test was performed. The results indicated the following: Chi-square = 4.832, degrees of freedom = 2, and $p = 0.089$. The results indicated no significant difference of interest level among respondents, regardless of the home school being located in a rural, suburban, or urban environment.

An evaluation of standard deviations and mean were also used to identify differences in responses among home school providers in rural, suburban, and urban areas. This evaluation identified that the strongest reason that respondents did not want to teach agriculture is because of lack of student interest.

To determine if the interest level of home school providers is different depending upon location of the home school, mean scores and standard deviation of items describing agricultural courses were evaluated. Urban home school providers were most interested in horticulture courses ($\underline{M} = 2.73$), followed by biotechnology courses ($\underline{M} = 2.69$). Suburban home school

Table 6
Mean Scores and Standard Deviations for Agricultural Courses Among Rural, Suburban, and Urban Respondents

Item	Location	N	M	SD
Agriscience	Rural	30	2.13	0.63
	Suburban	21	2.04	0.59
	Urban	14	2.15	0.50
Ag. Production and Management	Rural	31	2.50	0.68
	Suburban	21	2.30	0.46
	Urban	15	2.40	0.46
Animal Science	Rural	32	2.56	0.50
	Suburban	23	2.56	0.59
	Urban	16	2.44	0.73
Biotechnology	Rural	31	2.10	0.75
	Suburban	23	2.50	0.76
	Urban	16	2.69	0.73
Environmental Science &	Rural	32	2.43	0.67
Natural Resources	Suburban	24	2.54	0.66
	Urban	16	2.50	0.63
Horticulture	Rural	32	2.80	0.42
	Suburban	16	2.62	0.50
	Urban	16	2.73	0.40

Note. 0= no opinion; 1 = disinterested; 2 = perhaps interested; 3 = highly interested

providers were also most interested in providing horticulture courses (M = 2.62), followed by animal science (M = 2.56) and environmental science/natural resources (M = 2.54). Home school providers in rural areas were also most interested in horticulture courses (M = 2.80), followed by animal science (M = 2.56) and agricultural production (M = 2.50).

Analysis of variance was conducted to identify differences among respondents in rural, suburban, and urban environments. No difference was identified except in the biotechnology course. Urban respondents had a significantly higher interest in the biotechnology course than their rural or suburban counterparts ($F = 3.74$, $df = 69$, $p = .03$).

CONCLUSIONS/RECOMMENDATIONS

Due to the relatively low response rate, caution should be used when generalizing the results of this study. While the researchers attempted to control for nonresponse error, the results of this study should not be generalized beyond the respondents.

Home school educators in this study are interested in providing agricultural courses to students, but their interest level varies depending upon the agriculture course. Horticulture was found to be the course that seemed most appealing to home school providers. Textbooks were viewed as the most needed resource for teaching agriculture. The agricultural education profession should begin to inform home school providers about agricultural curriculum that can be used by home school students. Curriculum packages should be created that contains student textbooks, workbooks, teacher guides and other resources needed to teach specific agricultural courses.

Supervised agricultural experience programs are of interest to a majority of home school educators in this study. Home school providers indicate that a resource person in the agricultural education profession available to questions would be the most beneficial resource. The agricultural education profession should begin identify ways that home school providers could incorporate supervised agricultural experience programs in their school. Also, the agricultural education profession should develop training seminars and literature for home school providers.

The home school providers in this study were interested in only some of the activities offered by FFA. Home school providers indicated an interest in horticultural/plant science career development events, but not in leadership activities. A majority of home school providers need more information about FFA membership and activities. The FFA organization should look at marketing itself as an organization available for home educated students. FFA should also look how to include these students within its membership and allowing for involvement in events and activities.

The interest level of home school providers towards teaching agriculture is not influenced by the home school being located in a rural, suburban, or urban environment. However, home

school students should be studied to determine their interest level in agricultural courses, FFA membership and supervised agricultural experience in rural, suburban, and urban home schools.

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North Carolina Home School Providers' Perceptions of Agricultural Education -- *A Critique*

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The researchers are to be commended for delving into the home school movement, a somewhat controversial topic that could have a significant influence on how public secondary agricultural education is delivered. The authors indicated that the number of children being schooled at home is expanding in many states. Consequently, the implications of this expansion have yet to be identified, understood, or appreciated. A solid conceptual framework was built for the study. The authors focused correctly on why parents elect to home school their children, i.e., parental control, curriculum choice, and undesirable outside influences. They also focused extensively on why public schools and home schools should cooperate, share resources, and facilities. Notably absent from their review, however, are legal issues regarding the use of public funds for home schooling, charter schools, vouchers, etc. In many states, these separation of church, state, and private school issues are not close to being resolved. Yet, the authors' review focused almost exclusively on the positive benefits of using the public secondary agricultural education system to support home schooling. A balance review should include potential downsides of such a partnership even through the use of instructional technologies.

The authors did a credible job of leading into their problem from the review. The problem was easy to understand and the research questions clearly focused. The methods and procedures are clear and appropriate in most respects. I appreciate the manner in which the authors dealt with their 37% response rate yet cautioned the reader not to generalize the findings that are generally presented in a clear, concise manner. However, a question arose regarding the data analyses. Only half of the respondents were teaching students eligible for secondary agricultural education in the public school system. Yet, it is difficult to determine if the findings in Tables 1-5 apply to all 187 respondents or just the 51% who were teaching eligible students. This is a critical question because the findings in Tables 1-5 perhaps should apply to only high school students. Thus, the findings could have been inflated or deflated by individuals who probably could not provide valid responses. For example, compare Table 1 about high interest in agricultural courses vs. Table 3 with low interest in FFA activities. Without more clarity and precision on these issues, it is difficult to attach meaning to the findings.

Most of the conclusions and recommendations are predicated upon the findings. Yet, the findings cannot be interpreted in a balance manner because the literature review is devoid of writings not supportive of more public school involvement with the home schooling movement. Consequently, the authors conclude and recommend that the profession should embrace the home school movement, provide curriculum materials, involve more home schooled students in the FFA, and that the FFA should market itself to these students.

This paper is interesting and raises practical as well as philosophical questions that certainly cannot be answered with one study. The authors are to be complimented for their efforts. Subsequent papers should be edited and proofed better to avoid minor errors that detract from the quality of the manuscript.

ATTITUDE FORMULATION OF FOOD AND AGRICULTURAL SCIENCES INSTITUTE PARTICIPANTS: A LONGITUDINAL ASSESSMENT

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ABSTRACT

This purpose of this study was to assess the long term influence of the Food and Agricultural Sciences Institute on participants' and nonparticipants' attitudes and behaviors in relation to the food and agricultural sciences. The study comprised of 118 participants and 46 nonparticipants of FASI from 1994-1997. Out of 164 subjects, 82 responses were received which was a 50% response rate. Overall, the four participant groups were able to maintain their positive attitudes over the years. The participants' attitudes were more positive than nonparticipants. However, the nonparticipants' attitudes were positive as well. Almost 8% of FASI participants were in majors of the food and agricultural sciences. None of the FASI participants were employed in the field of the food and agricultural sciences.

Introduction

There are low enrollments of ethnic minority students in the food and agricultural sciences. For example, during Fall 1999, ethnic minority students across the country pursuing a B.S. degree in the food and agricultural sciences comprised 13.8% of the total population (FAEIS, 2000). Ethnic minority students across the country pursuing graduate degrees in the food and agricultural sciences comprised 10.5% of the total population. At Penn State, ethnic minorities comprised only 4.7% of the population pursuing undergraduate and graduate degrees in the College of Agricultural Sciences (College of Agricultural Sciences Enrollment, 2000).

Since minorities are underrepresented at the collegiate level, they are not enrolled in the classes or involved in the organizations to teach them the composition of the food and agricultural sciences. The low enrollments create a lack of awareness and lead to negative perceptions of agriculture. Most importantly, by not pursuing majors in the food and agricultural sciences, minorities exclude themselves from the largest employment market in the world, agriculture.

Lack of minority interest can be attributed to poor perceptions of agriculture as well. A major part of the problem is that professions in agricultural education and food production are often stigmatized in the minds of students, particularly African Americans (Morgan, 2000). Also, Jones and Bowen (1998) found that because African Americans have been and continued to be underrepresented in the agricultural sciences, many link this under-representation to perceptions about low salaries, unpleasant working conditions and slavery conditions that most African Americans faced over 140 years ago. In addition, Hispanics also tend to view agriculture as only farming, low paying jobs, manual labor, low technology, poor working conditions, and limited career potential (Nichols, Jimmerson, & Nelson, 1993).

Pre-College Recruitment Programs for Minorities

Various pre-college programs have been created to expose and attract ethnic minorities to the food and agricultural sciences. There are several positive benefits that minorities receive from participating in these types of science-based pre-college programs. The benefits of pre-college programs include facilitating academic and career opportunities, increasing subject matter competence, increasing science proficiency in the laboratory, changing attitudes in a positive direction, and enhancing one's self-concept (Pizzini 1986).

Texas A&M University's College of Agriculture and Life Sciences instituted a program called AgJumpstart in 1991 to allow minority high school graduates to enroll with no agricultural background, but a desire to explore various careers in agriculture. This program was rated successful by the program participants and administrators (Bowen, 1993). However, because of the Hopwood Court decision, the program was discontinued. The Hopwood Court decision was a ruling by the 5th U.S. Circuit Court of Appeals that race and gender based policies in state college admissions, scholarships, and recruiting programs were unconstitutional (Brooks & West, 1997).

At Mississippi State University, North Carolina State University, and North Carolina A&T State University, the Institute for Future Agriculture Leaders (IFAL) was conducted to increase minority enrollments in the food and agricultural sciences. The program at Mississippi State University was very effective in recruiting high quality students in the food and agricultural sciences but was terminated because of unstable funding (Vaugh & Bowen, 1993). At North Carolina State University, 70% of the students who attended IFAL later enrolled at the university. At North Carolina A&T, IFAL accomplished its objective of exposing minority youth to the food and agricultural sciences.

At Southern University and A&M College, the Beginning Agricultural Youth Opportunity Unlimited (BAYOU) Phase I program has also attracted minority students to the agricultural sciences. From 1992-1993, more than 75% participants enrolled in the food and agricultural sciences disciplines at the university (Rawls, 1994).

At The Pennsylvania State University, a program is conducted annually to teach and provide information and experiences to minority high school students about the food and agricultural sciences. This program is labeled the Food and Agricultural Sciences Institute for Academically Talented Ethnic Minority Students (FASI). The purpose of the Food and Agricultural Sciences Institute (FASI), a one-week intensive program for minority sophomore and junior high school students, is to introduce these students to the science-based curricula and careers in the food and agricultural sciences (FAS). These students are targeted for two reasons. First, there are few minority students in the College of Agricultural Sciences at The Pennsylvania State University. A critical mass is needed to demonstrate to minority students that they can have peers should they choose to study the food and agricultural sciences. Second, sophomores and juniors are targeted because they have a minimum of two years left in high school to complete appropriate science, mathematics, English, and other courses needed to effectively pursue majors in the College. Conceptually, the institute is planned, promoted, and conducted as a college-wide activity (Bowen & Bowen, 1997).

In Wiley's 1996 study, the 1994 and 1995 FASI participants were found to have positive attitudes toward the food and agricultural sciences. Also, she found that the 1994 participants were able maintain their positive attitudes after a year. Finally, Wiley compared the attitudes of the participants and nonparticipants and she found that participants had more positive attitudes towards the food and agricultural sciences than nonparticipants.

Purpose of the Study

The purpose of this study was to assess FASI's influence on participants' and nonparticipants' attitudes and behaviors in relation to the food and agricultural sciences. The objectives of the study were to:

1. Determine the stability of participants' attitudes toward the food and agricultural sciences.
2. Determine if participants have more positive attitudes than nonparticipants.
3. Analyze behaviors of the participants and nonparticipants regarding choice of a college major.
4. Analyze behaviors of the participants and nonparticipants regarding choice of a career.

Methodology

This study is built upon prior research involving 1994 and 1995 FASI participants and nonparticipants. Wiley (1996) studied the extent to which FASI could increase knowledge and change minority students' attitudes and behaviors toward the food and agricultural sciences. Her study included the 97 FASI participants and nonparticipants from 1994 and 1995. The treatment group consisted of the participants while the control group consisted of the nonparticipants or students who were selected, but could not participate in FASI for various reasons.

Theoretical Framework

The theoretical framework for this study was based on of the Swanson Model (1972) that was used by Wiley (1996) in a follow-up study of FASI paticipants. This model assumes relationships among knowledge, attitude, and behavior which suggests that as a person becomes more knowledgeable of and experienced in an area, that person will gradually begin to associate a positive connotation to that area and behave in a desired manner (Wiley, 1996). In this model, education and knowledge provide the base upon which changes of attitudes occur before behavior changes. Swanson (1972) states that knowledge alone is not enough to mediate the learning process because the reader will form an attitude toward the given subject. While knowledge is important, it is not the initiating force when behavior appears or changes (Swanson as cited by Wiley, 1996). Swanson (1972) developed a paradigm that demonstrates this model (See Figure 1).

Figure 1.

In the Wiley (1996) study as well as this study, students selected for a one-week Food and Agricultural Sciences Institute were exposed to the experiences and knowledge needed to form positive attitudes and behaviors about the agricultural sciences.

Population

The population for this study was comprised of all students who participated (participants) and those who were selected but could not participate (nonparticipants) in the 1994-1997 Food and Agricultural Sciences Institutes conducted at the University Park Campus of The Pennsylvania State University. This population was used to determine the influence of FASI on the subjects' attitudes and behaviors regarding choice of majors in college and career selections. The treatment group consisted of those students who were participants in the one-

week summer institute while the control group included the students selected for the Institute but who could not attend for various reasons (i.e., nonparticipants). For the 1994 group, there were 28 participants and 16 nonparticipants; in 1995, there were 36 participants and 17 nonparticipants; in 1996, there were 28 participants and 13 nonparticipants; and in 1997, there were 26 participants and 25 nonparticipants. There were no records of the 1997 nonparticipants, therefore, only the participants were included in the study.

Research Design

Two different modified nonequivalent control group designs with delayed posttests were employed for this study. The modified nonequivalent control group design with delayed posttests controls for history, maturation, testing, instrumentation, selection, and mortality (Campbell & Stanley, 1966).

Instrumentation

The instruments used in this study measured attitudes and behaviors of FASI participants and nonparticipants. A 10-item instrument (Wiley, 1996) was used to assess the attitudes of FASI participants and nonparticipants. Attitudes were measured on a four-point scale ranging from 1 "strongly disagree" to 4 "strongly agree".

Behaviors toward the food and agricultural sciences were measured using multiple choice and open-ended questions. These assessments included statements about the students' majors, career plans, and interest in the food and agricultural sciences.

A panel of five faculty, staff members, and graduate students in the Department of Agricultural and Extension Education at The Pennsylvania State University reviewed the instrument for content and face validity.

Data Collection

A total of 164 surveys were mailed to FASI participants and nonparticipants. There was a second mailing to nonrespondents two weeks later. After two mailings along with telephone calls and e-mails for nonrespondent follow-up, a 50% response rate was achieved (82 of 164 surveys).

Data Analysis

A General Linear Model for repeated measures, an Analysis of Variance, T-tests, and frequencies were used to analyze and interpret the data. The Likert scale responses were analyzed and interpreted as follows to be consistent with Wiley's 1996 research on FASI participants: 1.00-1.74= Strongly Disagree; 1.75-2.49= Disagree; 2.50-3.24= Agree; 3.25-4.00 Strongly Agree.

Table 1
Comparison of the 1994 Participants' Attitudes Toward the Food and Agricultural Sciences from 1994-2000 (n=14)

Item	Pretest (1994) Mean* SD	Posttest (1994) Mean* SD	Del. 1 (1995) Mean* SD	Del.2 (1997) Mean* SD	Delayed 3 (2000) Mean* SD	F value
1. I know very little about jobs and careers in the food and agricultural sciences.	3.00 .68	1.86 .36	2.21 .58	2.21 .70	2.64 .84	7.10**
7. When I hear the words "food and agricultural sciences," I usually think of farms with crops and animals.	3.00 .78	2.36 .84	2.29 .91	2.43 .76	2.21 .70	3.91**
9. Careers in the food and agricultural sciences touch the lives of people each day.	3.43	4.00	3.29	3.57	3.50	11.43**

* - Means based on 1=Strongly Disagree, 2=Disagree, 3=Agree, and 4=Strongly Agree
** - p<.05 determined by Pillai's Trace and the more conservative Greehouse-Geisser tests.
_____- p< .05 determined by the General Linear Model repeated contrasts
.....- p< .05 determined by the General Linear Model repeated contrasts

Table 2
Comparison of the 1995 Participants' Attitudes Toward the Food and Agricultural Sciences from 1995-2000 (n=18)

Item	Posttest (1995) Mean* SD	Delayed Posttest 1 (1997) Mean* SD	Delayed Posttest 2 (2000) Mean* SD
2. Most careers in the food and agricultural sciences involve outdoor work in fields.	2.83 .91	2.26 .99	1.89 .58
3. Courses in biology and chemistry are not needed for most careers in the food and agricultural sciences.	1.31 .75	1.50 .51	2.06 .87
7. When I hear the words "food and agricultural sciences," I usually think of farms with crops and animals.	2.67 .99	2.03 .99	2.06 1.06
8. When I hear the words, "food and agricultural sciences," I seldom think of laboratories with testing equipment.	2.67 .89	2.21 .88	1.89 .58

* - Means based on 1=Strongly Disagree, 2=Disagree, 3=Agree, and 4=Strongly Agree
_____- Practical difference of .50 or higher between the means
.....- Practical difference of .50 or higher for the means from the posttest to delayed posttest #2

Table 3
Comparison of the 1996 Participants' Attitudes Toward the Food and Agricultural Sciences from 1996-2000 (n=22)

Item	Pretest (1996) Mean* SD	Posttest (1996) Mean* SD	Del. 1 (1997) Mean* SD	Del.2 (2000) Mean* SD	F value
1. I know very little about jobs and careers in the food and agricultural sciences.	2.95 .65	1.27 .46	1.64 .58	2.32 .84	53.10**
7. When I hear the words "food and agricultural sciences," I usually think of farms with crops and animals.	2.63 1.00	1.91 .68	2.05 .84	1.91 .92	4.09**
8. When I hear the words, "food and agricultural sciences," I seldom think of laboratories with testing equipment.	2.41 .80	1.73 .70	2.14 .83	1.91 .87	5.18**

* - Means based on 1=Strongly Disagree, 2=Disagree, 3=Agree, and 4=Strongly Agree
** - p< .05 determined by Pillai's Trace and the more conservative Greehouse-Geisser tests.
_____ - p< .05 determined by the General Linear Model repeated contrasts
..... - p< .05 determined by the General Linear Model repeated contrasts
_ _ _ _ _ _ _ _ - p< .05 determined by the General Linear Model repeated contrasts

Table 4

Comparison of the 1997 Participants' Attitudes Toward the Food and Agricultural Sciences from 1997-2000 (n=10)

Item	Pretest (1997) Mean* SD	Posttest (1997) Mean* SD	Delayed Posttest (2000) Mean* SD	F value
1. I know very little about jobs and careers in the food and agricultural sciences.	3.30 .82	2.00 .82	2.30 .67	11.18**
2. Most careers in the food and agricultural sciences involve outdoor work in fields.	2.80 .42	2.50 .85	1.90 .57	5.20**

* - Means based on 1=Strongly Disagree, 2=Disagree, 3=Agree, and 4=Strongly Agree

** - $p < .05$ determined by Hotelling's Trace and the more conservative Greehouse-Geisser tests.

_____- $p < .05$ determined by the General Linear Model repeated contrasts

.....- $p < .05$ determined by the General Linear Model repeated contrasts

Table 5 Comparison of the Participants' 2000 Attitudes Toward the Food and Agricultural Sciences by Year of Participation

	1994 n Mean & SD	1995 n Mean & SD	1996 n Mean & SD	1997 n Mean & SD
5. I know someone who has a career in the food and agricultural sciences.	14 2.71 &.99	18 2.89 & .83	22 2.95 & .95	10 ** 1.60 & .52

* - Means based on 1=Strongly Disagree, 2=Disagree, 3=Agree, and 4=Strongly Agree
** - p=.001
_____- Means not significantly different
.....- Mean significantly different from means for 1994-1996 (p< .05)

ANOVA of Item 5 by Year

Source	df	SS	MS	F	p
Year	3	14.12	4.71	6.14	.001
Item 5	60	45.99	.77		
Totals	63	61.11			

**p=.001

Table 6

Comparison of the Participants' and Nonparticipants' 2000 Attitudes Toward the Food and Agricultural Sciences
Participants (n=64) and Nonparticipants (n=18)

Question	n	Mean	SD	t-value
1. I know very little about jobs and careers in the food and agricultural sciences.				
Participant	64	2.31	.79	-2.80**
Nonparticipant	18	2.89	.68	
2. Most careers in the food and agricultural sciences involve outdoor work in fields.				
Participant	64	1.83	.69	-3.49**
Nonparticipant	18	2.50	.86	
3. Courses in biology and chemistry are not needed for most careers in the food and agricultural sciences.				
Participant	64	1.83	.81	-.737
Nonparticipant	18	2.00	1.09	
4. Growing up on a farm is necessary for a career in the food and agricultural sciences.				
Participant	64	1.30	.66	-1.60
Nonparticipant	18	1.72	1.07	
5. I know someone who has a career in the food and agricultural sciences.				
Participant	64	2.67	.98	.02
Nonparticipant	18	2.67	.84	
6. There are few businesses in Pennsylvania where I can have a professional career in the food and agricultural sciences.				
Participant	63	1.71	.66	-2.70**
Nonparticipant	18	2.33	.91	

7. When I hear the words "food and agricultural sciences," I usually think of farms with crops and animals.				
Participant	64	2.13	.92	-1.29
Nonparticipant	18	2.44	.98	
8. When I hear the words, "food and agricultural sciences," I seldom think of laboratories with testing equipment.				
Participant	64	2.02	.77	-2.63**
Nonparticipant	18	2.56	.78	
9. Careers in the food and agricultural sciences touch the lives of people each day.				
Participant	64	3.58	.61	1.06
Nonparticipant	18	3.39	.85	
10. Our nation is very dependent on people who work in the food and agricultural sciences.				
Participant	64	3.64	.63	1.35
Nonparticipant	18	3.33	.91	

* - Means based on 1=Strongly Disagree, 2=Disagree, 3=Agree, and 4=Strongly Agree
** - $p < .05$

Results

For Objective 1, the stability of attitudes towards the food and agricultural sciences of the participants was determined.

A General Linear Model of repeated measures was used to determine if the desired positive attitudes of participants remained stable over time for the 1994, 1996, and the 1997 participants. For the 1995 participants, practical differences of significance were assessed.

For the 1994 participants, there were significant differences on items 1, 7, and 9 (see Table 1). On item 1, the participants agreed on the pretest and disagreed on the posttest that they knew little about jobs and careers in the food and agricultural sciences. There were no significant differences from the posttest to the delayed posttest. For item 7, the participants agreed on the pretest but disagreed on the posttest that they associate the food and agricultural sciences with farms with crops and animals. After the posttest, there were no significant differences. On item 9, the participants strongly agreed on the pretest, posttest, and delayed posttest but to different magnitudes.

For the 1995 cohort, practical differences were used because individual posttest scores were not available. Practical differences were found for items 2, 3, 7, and 8 (see Table 2). For item 2, the participants agreed (mean=2.83) on the posttest and disagreed (mean=2.06) on the delayed posttest that most careers in the food and agricultural sciences involve outdoor work in fields. On item 3 for the delayed posttest, participants strongly disagreed (mean=1.50) and then disagreed (mean=2.06) that courses in biology and chemistry are not needed for most careers in the food and agricultural sciences. On item 7, the participants agreed (mean=2.67) then disagreed (mean=2.03) that they associate farms with crops and animals when they hear the words food and agricultural sciences. For item 8, the long term effect from the posttest to the second delayed posttest indicates that the participants agreed (mean=2.67) and then disagreed (mean=1.89) that they seldom associate laboratories with testing equipment to the food and agricultural sciences.

For the 1996 participants, significant differences occurred on items 1, 7, and 8 (see Table 3). On item 1, the participants agreed (mean=2.95) on the pretest, strongly disagreed (mean=1.27) on the posttest, strongly disagreed on the first delayed posttest (mean=1.64), and disagreed (mean=2.32) on the second delayed posttest. For item 7, the participants agreed (mean=2.63) on the pretest then disagreed (mean=1.91) on the posttest that they associate the food and agricultural sciences with farms with crops and animals. On item 8, the participants disagreed (mean=2.41), strongly disagreed (mean=1.73) on the posttest, and then disagreed on the delayed posttest that they seldom associate laboratories with testing equipment to the food and agricultural sciences.

For the 1997 participants, significant differences occurred on items 1 and 2 (see Table 4). On item 1, the participants agreed (mean=3.30) on the pretest then disagreed on the posttest that they knew very little about jobs or careers in the food and agricultural sciences. On item 2, the participants agreed (mean=2.50) on the posttest and then disagreed (mean=1.90) on the delayed posttest that most careers in the food and agricultural sciences involve outdoor work in fields.

The Analysis of Variance (ANOVA) detected a significant difference between the 1997 participants and the rest of the participants regarding item number 5 (see Table 5). The 1994-

1996 groups know of someone who has a career in the Food and Agricultural Sciences while the 1997 group did not know of anyone in the Food and Agricultural Sciences.

For Objective 2 a comparison was made to determine if participants have more positive attitudes than nonparticipants. The t-test revealed significant differences between the FASI participants (treatment group) and FASI nonparticipants (control group) on four of the 10 attitudinal items: 1, 2, 6, and 8 (see Table 6). For item 1, the participants' mean scores reflect that they knew more about jobs or careers in the food and agricultural sciences while the nonparticipants knew little about the food and agricultural sciences. For item 2, the participants disagreed to a stronger degree that most careers in the food and agricultural sciences involve outdoor work in fields. On item 6, the participants also disagreed to a greater magnitude that there are few businesses in Pennsylvania where they can have a career in the food and agricultural sciences. Finally, the participants were more likely to disagree that they seldom think of lab equipment when they hear the words food and agricultural sciences as compared to the nonparticipants.

Even though participants had more positive attitudes than nonparticipants on these four items, the data illustrated that nonparticipants have positive attitudes as well. Nonparticipants agreed with the participants that courses in biology and chemistry are needed for most careers in the food and agricultural sciences; growing up on a farm is not necessary for a career in the food and agricultural sciences; they knew someone who has a career in the food and agricultural sciences; they don't associate the food and agricultural sciences to only farms with crops and animals; they understand that careers in the food and agricultural sciences touch the lives of people each day; and our nation is very dependent on people who work in the food and agricultural sciences.

For Objective 3 behaviors of the participants and nonparticipants regarding choice of college majo were analyzed. Only 7.4% of the participants who responded had selected majors in the Agricultural Sciences. There were no nonparticipants who were agricultural science majors. Almost 8% of the participants had graduated from college or technical school, but none had majors in the agricultural sciences. Almost 12% of the nonparticipants had graduated from college and none were agricultural science majors. Even though only 7.4 % of the participants had majors in the agricultural sciences, the participants were more likely to pursue majors in the food and agricultural sciences as compared to the nonparticipants.

For Objective 4, behaviors of the participants and nonparticipants regarding choice of a career were analyzed. None of the five participants who had graduated from college had careers in the food and agricultural sciences. There were two nonparticipants who had graduated from college. One had a career as an owner/manager of a corporation and the other is a medical student at the Penn State University Medical School in Hershey. The nonparticipants who had graduated were not in the food and agricultural science careers.

Discussion

Based on the findings, the 1994-1997 FASI participants were able to maintain their positive attitudes over the years. For items that had significant differences, attitudes were changed in a positive direction. Not only were the attitudes changed in a positive direction, they were also maintained in a positive direction. For the other items in which there were no significant differences, the desired positive effect was achieved. For the ANOVA, the 1997

cohort as a whole did not know anyone who had a career in the food and agricultural sciences as compared to the other groups. This indicates that the inexperience of the 1997 group has not allowed them to move far along in their schooling to network with other students or professionals in the food and agricultural sciences like the 1994-1996 groups.

For objective 2, the participants' attitudes were more positive than the nonparticipants on four items. They were able to learn more about the composition of the food and agricultural sciences on these four items perhaps from their exposure to FASI. However while making the comparisons between the participants and nonparticipants, nonparticipants reflected positive attitudes with the participants. These findings refute statements that minorities have negative attitudes toward the food and agricultural sciences associate them with slavery, low salaries, unpleasant working conditions, farming, low technology, and limited career potential (Morgan, 2000; Jones & Bowen, 1998; Nichols, Jimmerson, & Nelson, 1993).

For objective 3, FASI was able to influence the selection of a major. Almost 8% of the participants were agricultural science majors while none of the nonparticipants were food and agricultural science majors. Exposure to FASI was perhaps responsible for the difference.

For objective 4, None of the FASI participants were employed in the field of the food and agricultural sciences. However, the participants and the nonparticipants have not progressed far enough in the job market to establish a long time career.

Conclusions

The objective of the Food and Agricultural Sciences Institute (FASI) is to conduct a one-week intensive program for minority sophomore and junior high school students to introduce them to the science-based curricula and careers in the food and agricultural sciences. FASI has been conducted at Penn State for six years. A follow-up was needed to determine the long term effects of FASI as it relates to attitudes and behaviors of both participants and nonparticipants. The following conclusions are based on the findings of the study:

1. FASI participants were able to reflect stable positive attitudes over time toward the food and agricultural sciences.
2. Overall, participants had more positive attitudes than nonparticipants. However, nonparticipants reflected positive attitudes towards the food and agricultural sciences. Perhaps, FASI improved attitudes of participants toward the food and agricultural sciences.
3. Participating in FASI indicated that high school students were slightly more likely to become agricultural science majors than students who did not participate.
4. The Food and Agricultural Sciences Institute influenced some participants in terms of selecting a college major.
5. In reference to the Swanson Model, there is limited evidence that once students form positive attitudes toward a given subject, they will behave according to their positive attitudes. Few participants were food and agricultural science majors and no participants had careers in the food and agricultural sciences.

Recommendations

Based on the findings, the following recommendations are stated.

1. Institute Directors and Coordinators of FASI, should continue to maintain contact with former participants for support and for further recruitment efforts toward the food and agricultural sciences.
2. Institute Directors and Coordinators of FASI, should establish contact with former nonparticipants for support and for further recruitment efforts toward the food and agricultural sciences.
3. College recruiters in the food and agricultural sciences should not assume minorities have negative attitudes toward the food and agricultural sciences.
4. Stronger recruitment efforts are needed to compete with the other college majors by establishing relationships with high school counselors, arranging campus visits for high school students, providing pre-college programs like FASI, and awarding scholarships.

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Attitude Formulation of Food and Agricultural Science Institute Participants: A Longitudinal Assessment -- *A Critique*

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The study was designed to assess the long-term influences of a one-week Food and Agricultural Sciences Institute (FASI) for minority sophomore and junior high school students, on participants and non-participant's attitudes toward the food and agricultural sciences. This study expands on prior research of the FASI.

The purpose and objectives of the study were clearly stated. Appropriate research methods and procedures were utilized. The instruments were described and content and face validity were established. A fifty percent response rate with "extensive recontact procedures" was reported. No efforts to address non-response error were reported. The response rate combined with possible non-response error may present a threat to the generalizability of the results.

The authors did a good job of showing findings in a clear and orderly manner. The reviewer did note that a complete line of data is missing from Table 1. Prior to publication, editing and proofreading are warranted. Since the study focused only on minorities, should the title reflect such?

On only four of the ten items in the study, was it found that participants' attitudes were more positive than non-participants. The authors also note that on most of the other items, non-participants expressed positive attitudes similar to the participants. The discussion section of this paper could have been strengthened with some discussion as to possible intervening factors. These findings conflict with other studies and warrants further study.

The authors are to be commended for conducting a four-year longitudinal study. What the authors found in this study relates to one specific institute. Is this a special case? This study suggests that stereotypical negative attitudes of minorities toward food and agriculture sciences may no longer hold true and challenges the profession to expand upon this research and recruitment of minorities. Attitudes of high school students toward agricultural careers impact all of us.

MEASURING AND BENCHMARKING CLIENT SATISFACTION: IMPLICATIONS FOR PROGRAM IMPROVEMENT AND ACCOUNTABILITY

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MEASURING AND BENCHMARKING CLIENT SATISFACTION: IMPLICATIONS FOR PROGRAM IMPROVEMENT AND ACCOUNTABILITY

Abstract

Customer satisfaction has become an important performance measurement tool for many organizations and Cooperative Extension is no exception. In recent years, many states have conducted customer satisfaction surveys to gauge the quality of service provided by the Extension Service. Between Fall 1999 and Spring 2000, a customer satisfaction survey (CSS) was conducted by Clemson Extension Service. A total of 1068 clients responded to a 14 item survey. The survey elicited data on extension information use, satisfaction with services provided by Clemson Extension, and demographic information. Overall, findings indicated that customers were very satisfied with the service they received from Clemson Extension. In addition, a majority of customers indicated that the programs they attended were up-to-date, accurate, and relevant to their situations. A majority said that they have used the information, while some had shared information with their friends and neighbors. The CSS findings were benchmarked with two other states in the southern region as standards of measurement. The results of CSS have been used by county staff in budget decisions, in showcasing program accomplishments and in legislature days. Such use has contributed to meeting the organizational and stakeholder requirements. It is recommended that CSS be conducted periodically to assess how Clemson Extension Service is doing and what programmatic improvements are needed in the future.

Introduction

Cooperative Extension, like many public agencies has seen an increased emphasis on measuring quality of programs through customer satisfaction surveys (CSS). Customer satisfaction is becoming an important part of the culture of many organizations (Ladewig, 1997). Customer satisfaction provides for better understanding of services provided by extension from the customers' perspective. In addition, it helps understand expectations of customers and the extent to which an organization is satisfying the needs and wants of its customers (Biggs, Gordan, and Zimmerman, 1995). Customer satisfaction also serves as a link between the customers and a performance reward system, thus providing rewards for desired outcomes and identifying consequences for undesired outcomes (Cummings and Ladewig, 1998). According to Merritt (1998), customer satisfaction is an indicator of the quality of extension programs, and is critical for evaluation of the effectiveness of the organization.

Israel (1998) indicated that customer satisfaction surveys provide a number of benefits for extension. First, it tells us what differences our programs are making in the communities. Second, it serves as a mechanism to show our supporters and critics that our customers have a high level of satisfaction and they are using extension information. Third, it helps identify strengths and weaknesses of extension programs so that continuous improvements can be made. Finally, it helps to showcase successful programs in the annual report of accomplishment.

In recent years, several states have conducted Customer Satisfaction Surveys (CSS) to assess quality of extension programs. Prominent among the states were Florida, Kentucky, and Texas. Consensus from these studies indicate that Extension clientele are very satisfied with the delivery and content of the information provided.

Provisions of the 1993 Government Performance Results Act (GPRA) included the use of customer satisfaction as a key component of performance measurement. The South Carolina Budget Control Board (SCBC), in 1998, recommended that all public agencies in South Carolina periodically measure customer's satisfaction through obtaining information from the customers they serve. Berrio and Henderson (1998) suggested that extension organizations should conduct customer satisfaction surveys as an effort to assess the performance of the services from the customer perspective.

Purpose and Objectives

In the summer and fall of 1999, Clemson Cooperative Extension Service conducted a Customer Satisfaction Survey to determine what recipients of extension programs felt about the quality of services provided. Specifically, the study was designed to assess: 1) the relevance and quality of programs delivered by Clemson Extension Service, 2) the extent to which clients have used and shared the information, and 3) satisfaction with the services provided by Clemson Extension Service. In addition, an attempt was made to benchmark Clemson CSS study with other states (Florida and Texas) that have conducted similar customer satisfaction studies.

CSS Process and Procedures

In the following paragraphs, an overview of Clemson Extension's programs and client contact information for year 1999-2000 described. In addition, a brief description of the process and procedures involved in conducting the study are provided.

Clemson University Cooperative Extension Service offers educational programs in five different areas: agrisystems productivity and profitability, community and economic development, environmental conservation, food safety and nutrition, and youth development.

Extension agents in the counties conduct a variety of activities and educational programs to create awareness, knowledge, skills, and behaviors to bring about desired changes in the clientele they serve. Extension agents provide research-based information to the people to help them make informed decisions about problems they face.

Extension staff contacted 732,126 people in 1999-2000. Figure 1 shows that 40.1 percent of these contacts were White males, followed by 31.4 percent White females, 12.7 percent African-American males, 14.9 percent African-American females, and 1.0 percent others. Extension agents also conducted over 19,800 educational programs and activities in 1999-2000. Activities and programs included meetings, workshops, demonstrations, field visits, hands-on experiences, and other activities.

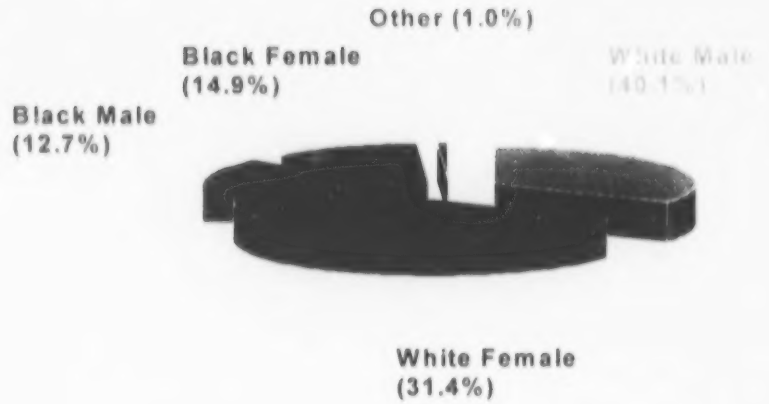


Figure 1: Total Contacts by Race and Gender--1999-2000

(N = 732,126)

Each of the 46 counties in the state was asked to randomly select 30 people (15 each from county office visits and program participation). As a result, the total population for the CSS was 1380. Forty-two of the 46 counties participated in this survey (N=1260). These 42 counties returned a total of 1068 completed surveys for a return rate of 84.7%.

A customer satisfaction survey (CSS) similar to the one developed by University of Florida was modified and used for the study. The CSS contained 14 questions which were grouped into: 1) type of participation—office visits and/or program participants, 2) extension information use, 3) satisfaction with Extension Service, and 4) demographic information—age, gender, race, education level, occupation, and number of years using Extension Service for information. In addition, the survey also recorded information on client address and telephone number, date of data collection and the name of the interviewer.

Prior to distributing the surveys, the entire process of conducting the CSS was shared with the 14 cluster directors. A detailed explanation on selecting respondents, data collection process, and other logistics were presented to the cluster directors. After addressing several questions and other issues concerning the survey and review of the survey instrument, cluster directors agreed to collect data during fall of 1999. A detailed plan on implementing the CSS was also developed.

Counties were asked to send the completed surveys to Extension Staff Development for analysis. Completed surveys sent by counties were checked, coded, and entered into a database. SPSS program for Windows was used to analyze the data. Frequencies, means and percentages were used to summarize the data. A CSS report for each county and cluster was prepared and sent to the cluster directors.

Since the sampling was not scientific, two demographic variables (gender and race) were compared with Clemson Extension Service contacts data (through CUMIS) and South Carolina population estimates (1998). Both gender and race variables were representative of the state's population (see Table 1).

Table 1: Comparison of CSS Sample with CUMIS Contact Data and South Carolina Population Estimates

Variable	Population Estimates (1998)	CUMIS Data (1999)	CSS Sample (1999)
Gender			
Male	48%	45%	46%
Female	52	55	54
Race			
White	69	76	75
Black	30	23	24
Other	1	1	1

CUMIS—Clemson University Management Information System
CSS—Customer Satisfaction Survey

Findings

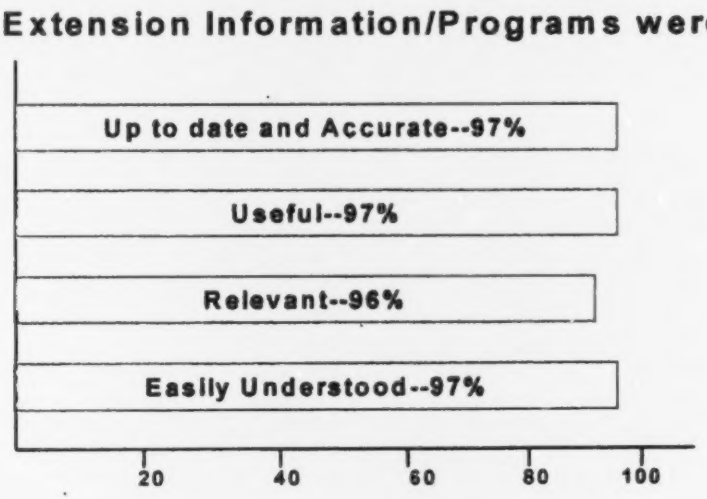
Demographic Information:

As indicated earlier a total of 1,068 completed surveys were received and included in the analysis. The demographic information revealed that 32 percent of the respondents lived on a farm, 30 percent in a rural area, 33 percent in towns and cities under 50,000 population, while five percent lived in cities with a population of over 50,000. Fifty-four percent of those responding were female and 75 percent white Caucasian, 24 percent black, and one percent other (Hispanic, Asian). Regarding age, 14 percent were under the age of 35 years, 43 percent between ages 36-45, 22 percent between 56-65, and the remaining 21 percent were over 66 years. Examination of education level of respondents revealed that 33 percent had at least a high school education or GED, 47 percent had completed college, 20 percent had completed post-graduation degrees. Only nine percent reported less than a high school education. On an average, respondents have been using Extension Service for information for over 16 years.

Relevance and Quality of Extension Information:

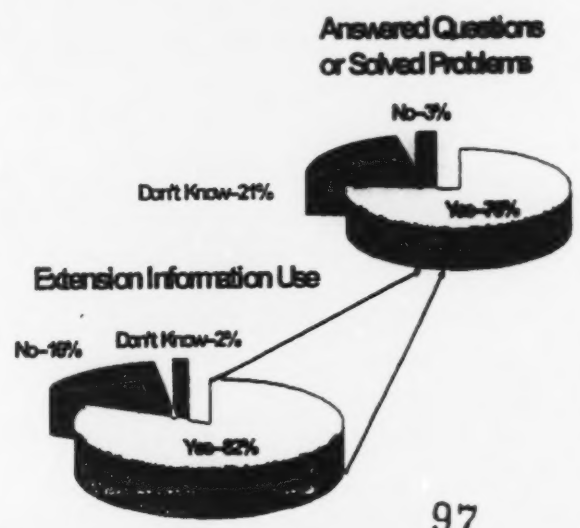
As shown in Figure 2, customers who participated in Clemson Extension programs or

visited the Extension office for information were very impressed by the quality of information they received relative to food safety, water quality, crops, financial management, community development, youth development, and others. Ninety-seven percent said that the information presented was up-to-date and accurate, useful, and easy to understand. Ninety-six percent found it to be relevant to their situation.



Extension Information Use:

Eighty-two percent of the respondents indicated that they have used the information (Figure 3). Seventy-six percent of those who had used the information said that it had solved their problems or answered the questions. However, 21% said "don't know" because they are still in the process of using the information they had received from participating in extension programs.



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This is what they said:

"Followed directions, continue to do so and fire ant mounds are non-existent in two acres."

"I have used the information to determine sodium contents of foods since I need to watch sodium in my diet."

"Recently had a Will made because of the program, and the information helped out a great deal."

"Information helped to decide what variety of corn is suitable for our farm from Extension's 'Corn Letter' – same for vegetables. Also, soil sample results are a great help each year."

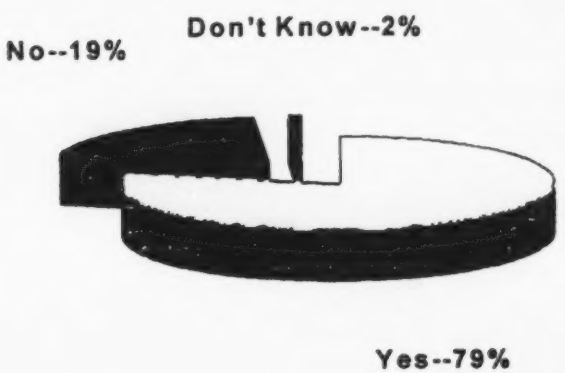
"Information referring to horticultural practices and pesticide management very helpful."

"I started being more careful about shopping and reading labels, and putting food away when I have finished cooking."

"I was interested in public speaking and the 4-H office gave me a course. I later won the 4-H State Public Speaking Contest."

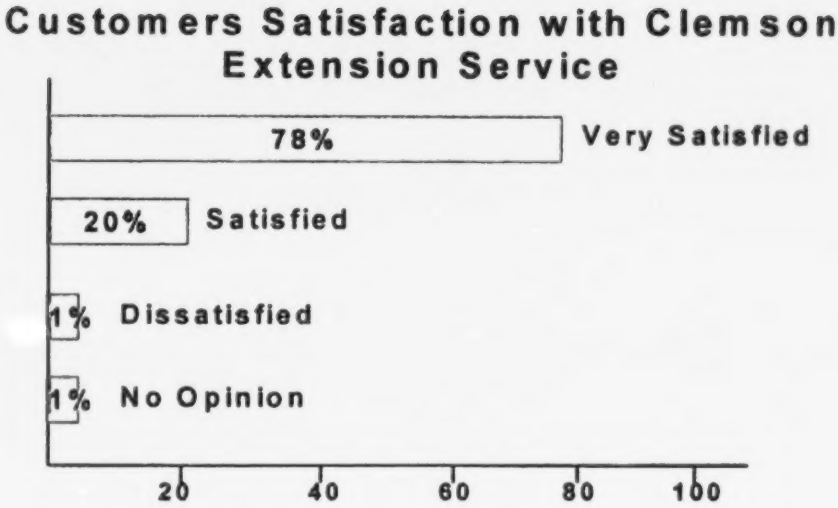
Seventy-nine percent of the participants said that they have shared the information with their friends and neighbors.

Shared Information with Someone



Satisfaction With Clemson Extension Service:

In response to the question, "How do you feel about the services provided by Clemson Extension" 78 percent said that they were "very satisfied" with the service, 20 percent said they were "satisfied," less than 1% said they were "dissatisfied," and 1% of the respondents had "no opinion."



Benchmarking CSS:

A benchmark is something that serves as a standard (Webster's). According to David Kearns, CEO of Xerox Company, benchmark is the continuous process of measuring products, services, and practices against the toughest competitors or those recognized as industry leaders. Ladewig (1998) suggested that Cooperative Extension Service develop benchmarks on three major aspects of extension programs—relevance, quality and accomplishments. In this study, we have made an attempt to benchmark "quality" of extension programs by measuring and comparing customer satisfaction. Two extension organizations in the Southern region (University of Florida Extension Service and Texas A & M Extension Service) were used as benchmarks to compare with Clemson CSS. As shown in Table 2, data from the three organizations reveal somewhat similar findings. Overall, customers, regardless of the state or the type of extension program they attended are very satisfied with the service provided by Extension. Satisfaction was very high in all the three states with Texas A & M having the highest (82%), followed by University of Florida (80%), and Clemson (78%). Extension information in terms of accuracy, usefulness, ease of understanding, and up-to-date was high for Clemson Extension, followed by University of Florida and Texas A & M. A higher percentage of Clemson customers had the opportunity to use and share the information when compared to University of Florida customers.

Table 2: Benchmarking of Clemson CSS Study With University of Florida and Texas A & M

Extension Information	Clemson University CSS (1999) (n= 1,068)	University of Florida CSS (1998) (n=524)	Texas A & M CSS (1997) (n=2,229)*
Extension information is:			
Up-to-date and accurate	97%	95%	90%
Useful	97	-	89
Relevant to your situation	96	94	91
Easy to understand	97	97	90
Opportunity to use information	82%	73%	-
Shared information with others	79%	69%	-
Very Satisfied with Extension Service**	78%	80%	82%

* means were converted into percentages
** measured on a scale: 1=very dissatisfied to 5=very satisfied

Conclusions and Discussion

Extension customers are very satisfied with the information they received from Clemson Extension offices in the counties. They indicated that the information they received was accurate, up-to-date, and relevant to their situations. In addition, customers indicated that they made use of the information to solve the problem or answer a question regarding an issue or a concern. This positive use of information can be linked to not only knowledge and skills acquisition, but also inclination toward adopting a recommended practice. Customers also indicated that they have shared the information with their friends and neighbors, indicating confidence and trust they have for extension programs and the information received. The findings of this study are more or less similar to the studies conducted by University of Florida and Texas A & M University.

As indicated by Israel (1998), customer satisfaction surveys have several benefits. The feedback from this survey helps agents to continue to improve delivery of extension programs. Data from the customer satisfaction study has provided a wealth of information for agents on how to improve programs and meet the needs of the clientele they serve. Cluster directors have used data from customer satisfaction surveys for justification of county budgets and to show stakeholders that extension programs do make a difference. Furthermore, the successful

completion of the customer satisfaction survey has demonstrated to the legislators that Cooperative Extension is willing to ask customers on how it is doing? and then act on their suggestions for improvement. Further, Clemson Extension Service has demonstrated that it can fulfill the requirements and/or mandates of the South Carolina Budget Control Board. Finally, the results of benchmarking have provided a basis for comparing with our other state counterparts relative to program performance and accountability.

Customer satisfaction should be conducted periodically to identify what our customers' needs are and how those needs can be met. In addition, customer satisfaction surveys helps to answer the question, "how are we doing?"

Findings from customer satisfaction surveys should be shared with university and extension administration, stakeholders, extension agents and specialists, for making informed decisions and making them aware how important it is for organizational and stakeholder accountability.

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Measuring and Benchmarking Client Satisfaction: Implications for Program Improvement and Accountability – *A Critique*

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The author has studied a topic of increasing interest to professionals in extension and agricultural education, that of customer satisfaction. A customer satisfaction survey was conducted to ascertain how the recipients of extension programs in South Carolina felt about the quality of services provided. An attempt was also made to benchmark this study with similar studies conducted previously in Florida and Texas.

The purpose and objectives of the study were clearly stated. Included were statements as to why the study was important and how the study results could be utilized. Although the customer satisfaction survey was identified and the type questions were noted, the method used to collect the data is not well described. It is noted that the name of the interviewer was recorded, and that the process was shared with the cluster directors, however, no discussion is included as to how the process was conducted. No information on instrument reliability or validity was reported. All 46 counties were asked to participate; only 42 counties actually participated with an 84.7% response rate. This is a good response rate, however, no efforts to address non-response error among the non-participating counties is reported. Possible non-response error may present a threat to the generalizability of the results. A random follow-up of non-respondents would greatly improve the generalizability of the study.

The authors note that sampling was not scientific and used two demographic variables (gender and race) to compare their respondents with Clemson Extension Service contact data and the South Carolina population estimates and found both variables to be representative. This concession is admirable, but it would have been better to give the agents specific instructions in how to randomly select participants.

The conclusions seem to flow logically from the findings being reported except for the statement, "…survey has demonstrated to legislators that Cooperative Extension is willing to ask customers on (sic) how it is doing? And (sic) then act on their suggestions for improvement." Although the later part of this statement, "and then act on their suggestions for improvement" might be the case, the findings necessary to support this conclusion were not within the scope of this study as reported

The author should be commended for exploring a very timely topic and concisely reporting their findings. Their efforts to benchmark their findings with other states within the region are commendable. Customer satisfaction among our clientele is of importance to all us as we strive to maintain our current services in light of declining resources.

4-H VOLUNTEERS AND THE INTERNET-A PARTNERSHIP FOR THE FUTURE

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4-H VOLUNTEERS AND THE INTERNET-A PARTNERSHIP FOR THE FUTURE

Abstract

Eighty-four percent of 4-H volunteers in Pennsylvania own a computer. Almost 70% have access to the Internet from their home. Volunteers in this study are receptive to receiving curriculum projects and resources from the Internet and over half of the volunteers access the Internet at least once each week. Over 65 % of 4-H volunteers are willing to provide their e-mail address to receive updated communication from the local extension office and the Department of Agricultural and Extension Education at Penn State. Barriers to access and reasons for those who don't want electronic transmission of resource materials are discussed. Policy direction is given to state curriculum committees for curriculum development and delivery of new and existing 4-H curricula. Implications for 4-H youth and volunteer recruitment is also discussed as accessibility across the nation increases.

Introduction

The Pennsylvania 4-H Youth Development Program serves over 112,000 youth, ages 8-19, with the support of more than 19,000 teen and adult volunteers. Youth in the 4-H program have over 140 educational projects from which to choose. 4-H curricula is designed to teach life skills to enable youth to become productive, caring, and contributing members of their communities. Youth are enrolled as 4-H members in community clubs, project clubs, school enrichment experiences, after-school clubs, or as an individual member with an adult helper. Curricula (projects) and supporting resource materials are available from the 67 county cooperative extension offices. 4-H youth development educators employed by Penn State University and located in every local county extension office. 4-H educators are available to assist 4-H volunteers in starting clubs, provide leader training, and offer additional leadership and educational experiences for the volunteers and youth. Traditionally, 4-H volunteer leaders contact the extension office to review curricula and supporting resources, obtain copies of projects materials, and receive training and support needed to effectively perform the responsibilities of their positions.

Theoretical/Literature Base

The Internet has changed the way that we receive information both professionally and personally. Although, computers have been a common productivity and communication tool in the workplace for many years, use of the Internet by families is growing. Lewin (2001) reports in a New York Times article the findings from The David and Lucille Packard Foundation computer access study that seventy percent of American households with children ages 2 to 17 have computers, and 53 percent are connected to the Internet. In Pennsylvania more individuals have computer access at home than at work. (PaSDC Research Brief, 2000). Fifty-four percent of the people polled in the Penn State survey, reported having computers in their home while only 43% reported having access to a computer at work. Of those with a computer at home, over 90% used it to access the Internet and 95% used it for electronic mail. (PaSDC Research Brief, 2000).

The Packard Foundation study also reports that only about 22 percent of children in families with annual incomes of less than $20,000 have access to a home computer, compared with 91 percent of those in families with incomes of more than $75,000. The digital divide is a national problem in schools and families. This trend is mirrored in Pennsylvania. Pennsylvania citizens with higher incomes are also more likely to own a computer. Ninety-three percent of Pennsylvania families with incomes of $75,000 or more have a computer. In families earning between $10,00-$20,000, only 16% have access to a computer at home (PaSDC Research Brief, 2000). Income of the 4-H volunteers in this study was not surveyed to determine if the "digital divide" exists among our 4-H volunteers; however, it is an issue that should be recognized as we move towards higher levels of electronic communication.

As an educational delivery system, the Internet, can be interactive, responsive to the needs of its users, and provide information "on-demand." In addition to providing easy access to educational resources for 4-H volunteers and youth, access is available to the general public via the Internet. A 4-H presence on the Internet may prove to be a powerful recruitment tool for both volunteers and youth. Culp and Nolan (2000) report that successful recruitment depends upon effective marketing to targeted populations who have an interest in the organization, its clientele or mission. They indicate that keeping an up-to-date home page and linking it to popular and related web sites will help the organization attract and keep volunteers. Ellis (2000) provides and overview of new trends in volunteering. She indicates that the explosion of the World Wide Web not only helps with recruiting, but has also begun a new form of volunteering: virtual volunteering. Volunteers can complete assignments from their homes, providing valuable services to organizations.

An informal survey by the author of other land-grant universities indicates a trend towards distributing publications electronically. Of the 14 4-H web sites examined, 10 provided curricula on their web site. None of the sites restricted access to the general public. One example of Internet-delivered curriculum is AvianNet, a web site developed at Purdue to deliver poultry information to county educators, poultry producers and youth. The publications section of the site houses a collection of various poultry production electronic publications and is the most widely used resource on the AvianNet site. (Latour and Meunier, 1999).

Purpose and Objectives of the Study

In Pennsylvania, extension curriculum committees in nine program areas determine new curricular priorities, curriculum delivery methods, and appropriate evaluation techniques for 4-H youth curricula. The curriculum committees are also responsible for review and revisions of existing curricula. During 2000, several of the curriculum committees discussed delivering curriculum resources using the Internet as the sole delivery method or to provide supplemental resources to printed curricula. A curriculum management team comprised of the chairs of the curriculum committees did not have accurate data to recommend moving some curricula to Internet-only delivered projects. Questions of availability of access, frequency of access, and receptiveness of volunteers to utilizing this new delivery strategy were raised.

The purpose of this study was to determine if 4-H volunteers in Pennsylvania are receptive to receiving curriculum projects and resources directly from the Internet. The study also examines current rates of accessibility of the population of 4-H volunteers Additionally, the frequency of access to the Internet was determined among the population of 4-H volunteers.

Methods and Procedures

The target audience for this study was current adult 4-H volunteers. A stratified random sampling process was used to select the sample population. County 4-H coordinators (n=67) were each sent 15 surveys to mail to a randomly selected list of 4-H volunteers. A 4-H volunteer must be enrolled and screened to be on a current mailing list. Lists are updated at least every other year. A current roster of 4-H volunteers reduces the error of including names of people who are not in the study population. Of the 67 counties in Pennsylvania, 59 participated in the study, and mailed 885 surveys to 4-H volunteers. A total of 554 surveys were returned; however, 41 did not return a consent to participate in the study and were not used, resulting in a total of 513 useable surveys. A follow-up letter with a replacement survey was sent to non-respondents (Dillman, 2000). An additional 35 surveys were returned, thus 548 surveys were used for the analysis yielding a 61.9% response rate (see Table 1).

Table 1: Number of counties participating and volunteers responding

Number of counties participating	Surveys returned	Surveys received without consent	Surveys used for analysis	Response rate
59 (88%)	589 (66.5%)	41 (4.6%)	513+35= 548	61.9%

The survey consisted of eleven quantitative questions relating to availability of access to the Internet and e-mail, likelihood of access, frequency of access, willingness to provide an e-mail address and two questions related to the demographic characteristics of the respondents. One qualitative question was included to ask respondents, if they were not very likely to access 4-H curriculum materials and resources from the Internet, to indicate their reasons. Responses to this question were put into meaningful categories by the author. The categories of responses were ranked by frequency cited.

The survey questions were developed by the author and reviewed by the state program leader for children, youth and families, the department head of Agricultural and Extension Education, and four county 4-H youth development educators to establish face and content validity. Descriptive statistics (frequencies and percentages) were used to analyze the data.

Results

The major findings of this study highlight the availability and accessibility of the Internet to our 4-H volunteers and how willing they are to use it to receive information regarding 4-H projects and resources. Reasons for volunteers who are extremely unwilling to use this technology are cited. Of the 548 valid responses, the length of service as 4-H volunteers varied. Forty-one percent of the respondents were 4-H volunteers for one to five years. Twenty-two percent of the volunteers served between six and ten years and six percent have 16-20 years of service as a volunteer. Those volunteers with more than 20 years of tenure totaled almost 10

percent of the respondents. Six percent of the survey respondents were volunteering for less than one year.

Computer and Internet access

Eighty-four percent of the 4-H volunteers in Pennsylvania have a computer in their home. Over half (54.2%) of the volunteers who are employed have access to a computer at work. Of those who don't have a computer at home and are employed, an additional 3.9 % have access to a computer at work. Thus, about three-quarters (75.9%) of the 4-H volunteers have a computer available for their use.

Owning or having access to a computer does not correlate to access to the Internet. 4-H volunteers were asked if they had access to the Internet from their home computer. Of those who had a computer at home, 69% had access to the Internet from this computer. Of those who did not have access at home, an additional 1.6% of the employed volunteers had access at work. A total of 70.6% of 4-H leaders who responded to the survey have access to the Internet either at home or work (see Table 2).

Table 2: Computer Ownership and Access to Internet

	Own a computer	**Computer at work**	**Access to Internet (home)**	**Access to Internet (work)**	**Access to Internet at work or home**
YES	84.8%	58.0%	69.0%	38.2%	70.6%
NO	15.2%	36.1%	15.8%	19.3%	
NA*		5.9%*	15.2%*	42.4%*	
TOTAL	100%	100%	100%	100%**	70.6%

*not applicable—don't work or don't own a computer
**rounded to equal 100%

Frequency of access to Internet

Frequency of access to the Internet, on the average, was reported by the 4-H volunteers. About 52% of 4-H volunteers access the Internet at least once/week with 33.5% accessing the Internet more than once each week (see Table 3).

Table 3: Frequency of access to Internet

Frequency of Access	Frequency	Percent
Once/month	50	9.3%
Twice/month	66	12.3%
Once/week	101	18.9%
More than once/week	179	33.5%
Don't access	40	7.5%
NA	99	18.5%
TOTAL	535	100%

Likelihood of accessing the Internet

Volunteers were asked how likely they were to access 4-H curriculum materials and resources from the Internet for use with their 4-H clubs (see Table 4). Using a four point Likert-type scale to indicate likelihood of access, forty-six percent of the 4-H volunteers were *very* likely or *extremely* likely to access 4-H curriculum materials on the Internet, if available. Twenty-four percent indicated that they were *somewhat* likely to access materials from a web site. About 12% indicated that they were *not very* likely to access a web site for curriculum resources. The 12% of respondents who were not very likely to access the Internet for curriculum resources were asked to indicate reasons why they chose this response. Responses were categorized and are listed in order of frequency of response in Table 5:

Table 4: Access curriculum information and resources

Likelihood of Accessing Information	Percent
Not very likely	12.1%
Somewhat likely	24.0%
Very likely	28.1%
Extremely likely	17.5%
NA	18.4%
TOTAL	100%*

*rounded to equal 100%

Table 5: Reasons for Not Very Likely to Access Internet

Reason for Not Very Likely to Access	Number of Responses
No access to the Internet at home	17
Computer for work use only	12
No time to access the Internet	10
Don't use the Internet often enough	8
No computer	7
Not computer/Internet literate	5
Technical difficulties with connections to Internet	2
Already using curriculum resources from other sources	2
Can't print for club members	2
Need personal contact	2
Printed materials are easier to access	1

Willingness to provide e-mail address to receive 4-H notices and updates

Using a four point Likert-type scale, over 65% of the responding 4-H volunteers indicated that they are *willing* or *extremely* willing to provide their e-mail addresses to receive information directly from the Department of Agricultural and Extension Education at Penn State where the 4-H youth development program is housed. The percentage of volunteers who were *not at all willing* to provide their e-mail address was about four percent (see Table 6). It should be noted that 19.4% did not respond because they do not have e-mail capability.

Table 6: Willingness to provide e-mail address

Willingness	Frequency	Percentage
Not at all	21	3.9%
Somewhat	30	5.6%
Not sure	28	5.2%
Willing	181	33.5%
Extremely willing	175	32.4%
Not applicable	105	19.4%
TOTAL	540	100%

Educational, Scientific, and Practical Importance of the Study

There are many benefits for volunteers and the extension organization to Internet distribution of resources. 4-H volunteers are willing to use this new technology to receive curriculum resources; thus, Cooperative Extension needs to rapidly provide resources to increase

our web-based curricular offerings. Findings from this study were shared with the curriculum committee chairs to provide them with the rationale to develop web-delivered curriculum. In addition to curriculum committees, data from the study need to be communicated with county-based extension educators so they understand the level of receptivity of volunteers to using the Internet. A common reason cited by county educators is that volunteers need "personal contact" with the extension office. This reason was at the least cited reason from the volunteers who were not very willing to receive information from the Internet.

The computer ownership among 4-H volunteers is higher than the ownership rate for Pennsylvania citizens and should be viewed as an asset to our information delivery system. In addition to Internet-delivered resources, e-mail communication with volunteers should be explored as a cost-effective way to distribute newsletters, updates, information about meetings, and other relevant information to our volunteer corps. These communications could come from either the county extension office or directly from the state administrative office.

Volunteers are accessing the Internet at rates that allow for frequent information sharing and updating. Volunteers could receive updates and new information as soon as it is available. Internet distribution of information for volunteers also allows for rapid revisions and updates to ensure that current information is available for our volunteer population. Volunteer frustration at finding projects and publications "out-of-stock" will be reduced causing less need to postpone or delay conducting meetings or activities with the youth with whom they work.

Providing curricula and resources on the Internet via a volunteer web site not only allows the volunteer to access the publication or resource on-demand, but also provides an opportunity for Cooperative Extension to provide links for volunteers and the youth to learn more about their topics of interest. We can attract them with information that they need for use directly with their 4-H clubs, and then entice them to learn more or further develop their areas of expertise.

Reliability of access for the volunteer is also a factor in determining how an organization distributes publications and resources. Telephone connections in many rural areas are not at the same level as in urban communities (Samson, 1998). There can be unexpected interruptions causing user frustration. Designing web-based curricula with the end user in mind is important. A "text-only" option should be available for all curriculum resources to decrease the time it takes to download a page to the web browser thus reducing frustration and saving time.

4-H curricula and resources stored as electronic publications to print-on-demand, save valuable physical storage space; however, if Cooperative Extension moves towards a "print-on-demand only" philosophy of publication distribution, budget reallocation should be explored to provide county extension offices or volunteers with funds to print quantities of publications previously made available to them in print form.

Further study is needed to evaluate Internet-delivered curriculum as an acceptable delivery strategy. In addition, this study did not explore web-based curriculum that is completed on-line by the 4-H'er. Interactive curricula for youth is a natural next step to providing curriculum projects and resources on the Internet.

The largest percentage of the 4-H volunteers (41%) in the study served as volunteers between one and five years. Meeting the needs of these new volunteers as well as our more tenured volunteers in ways that will save them time is important to keep them active and involved. The Internet should not replace volunteer connections to their local extension offices, but provide a way to supplement curriculum information, obtain information on an "need to know'" basis, and open the door for those not familiar with the vast resource base in the 4-H youth development program and Cooperative Extension.

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4-H Volunteers and the Internet
A Partnership for the Future – *A Critique*

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The author has studied a topic of increasing interest to extension and agricultural education professionals, the use of the Internet by our constituents for accessing resource information. The purpose of this study was to determine if 4-H volunteers in Pennsylvania are receptive to receiving curriculum projects and resources directly from the Internet.

Using survey research techniques and a stratified random sample, this quantitative study ascertained the receptivity and accessibility of Pennsylvania 4-H volunteers to receiving curriculum projects and resources directly from the Internet. Appropriate research methods and procedures were used, with surveys sent to each of the 67 County 4-H coordinators in Pennsylvania to mail to randomly selected 4-H volunteers. Although they had a response rate of 61.9%, one must note that only 59 of the 67 counties actually participated and no discussion is included as to any efforts to follow-up on the non-participating counties. This reviewer believes that some comparison of the participant to the non-participant counties would have strengthened the generalizability of the study.

The findings report the availability and accessibility of the Internet to Pennsylvania's 4-H volunteers and their willingness to use it to receive information regarding 4-H projects and resources. Reasons were shared as to why 4-H volunteers were not very likely to access information on the Internet. Barriers to access and use of the electronically transmitted of resource materials was also discussed.

The conclusions drawn from this study are supported by the findings, which are well organized and clearly stated. The author wisely acknowledges that, although computer ownership among 4-H volunteers tended to be higher than the ownership rates among all Pennsylvania citizens, owning a computer did not correlate with access to the Internet. The study leads the profession to address other areas which require further study such as the use, feasibility and barriers to Internet-delivered curriculum.

PHILOSOPHIES OF ADULT EDUCATION AS PRACTICED BY AGRICULTURAL EDUCATION TEACHERS

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PHILOSOPHIES OF ADULT EDUCATION AS PRACTICED BY AGRICULTURAL EDUCATION TEACHERS

Abstract

The purpose of this study was to increase understanding of adult education philosophies as practiced by Pennsylvania, West Virginia, and Virginia secondary school agriculture teachers. A Philosophy of Adult Education Inventory (PAEI), developed by Lorraine M. Zinn and a researcher-created demographic sheet was sent to a sample of agriculture teachers in the tri-state area. One hundred and eighteen secondary agriculture teachers responded to the survey (38%). The average respondent was male, 44 years of age, had 18 years teaching experience, and had taught adult education classes for 14 years. Approximately 50% had formal training in teaching adults and two-thirds were paid to teach adult classes in agriculture.

Slightly more than two-thirds of the educators in the tri-state area identified with the Progressive philosophy. This philosophy of adult education is concerned with the well-being of society and an individual's role in society. Analysis of variance statistical procedures were used to distinguish differences between the means of the five philosophical groups and key demographic variables used in the study. When the five philosophical group means were compared by state, a statistically significant variance was determined between the Humanistic Philosophy and the state variable. Further analysis showed a statistical difference between the mean score of Pennsylvania and West Virginia.

Introduction

Over the past one hundred and twenty-five years, agricultural education has been a pioneer in the development of adult education. This effort was enhanced with the passage of four major pieces of Federal legislation. The Morrill Act of 1862 established the Land-Grant Colleges. Their emphasis on education in agriculture and the mechanical arts was designed to improve social and economic conditions for the rural population. In 1887, the Hatch Act established the Agricultural Experiment Stations. By making it possible to apply scientific findings to real world agricultural problems, the Hatch Act increased the need for adult education in agriculture. The Smith-Lever Act of 1914, which established the Cooperative Extension Service, and the Smith-Hughes Act of 1917, which established vocational education in agriculture in the public schools, provided a specific response to the need for adult education in agriculture (Bender, McCormick, Woodin, Cunningham, & Wolf, 1972).

While agricultural education was a pioneer in the development of adult education programs, the number of secondary agricultural education programs offering an adult component has declined in recent years. In 1989, Birkenholz and Marcie (1991) found that while there were 5,852 secondary agriculture programs in the United States, there were only 1,610 adult agriculture programs. In 2000, Burdette (unpublished manuscript) found less than one fourth of the agricultural educators in West Virginia (22.7%) were conducting organized educational activities for adults outside of the normal school day.

Adult agriculture programs are more important today than ever before because of rapid advances in technology, innovative marketing, new farm management techniques, new agricultural laws, and regulations (Chizari & Taylor, 1991). A study by Lilley, et al., (as cited in Chizari & Taylor, 1991) suggests that adults in production agriculture need classes on feeds, crop

production, soil sciences, farm records and management, farm mechanics, long range planning, government laws, and regulations. Drueckhammer and White (1984) suggested that because of the declining numbers in agricultural producers, the need for production information has decreased also. Harbstreit (as cited in Birkenholz & Maricle, 1991) stated that adult agricultural education programs used to focus on improving the efficiency in production agriculture and managerial skills, now the focus has shifted to problems of agricultural consumers, homeowners, gardeners, and concerned citizens. Nur, Birkenholz, and Stewart (1989) agreed that a shift in the target audience and the knowledge base for adult education programs has occurred.

- An important factor in an adult educator's purposes, methodology, and teaching processes is their philosophy of education (Wingenbach, 1996). Philosophies of adult education are the beliefs about the way in which adult education should be conducted and the general principles that guide practice (Beder, 1989). Therefore, developing a working philosophy of adult education is important to adult educators when planning programs.

Many leaders in adult education have developed principles to help educators form a working philosophy. Apps (1981) suggested the following guidelines, consisting of four phases, to develop one's own adult education philosophy.

- Identify beliefs about adult education by asking oneself questions about the learner, the overall purpose of adult education, content or subject matter, and the learning process.
- Search for contradictions in the beliefs.
- Discover where the basis for these beliefs came from and find supporting beliefs.
- Make judgments about the beliefs held.

Another leader in adult education, Beder (1989), formed principles that are not as lengthy and could be used to build a foundation of philosophy in adult education. The five principles are:

1. Whether society is basically good or is inherently flawed, it can and should be improved. In this, adult education can and should play a major role.
2. If individuals and ultimately societies are to prosper, learning must continue throughout life.
3. Adults are capable of learning and should be treated with dignity and respect.
4. All adults should have access to learning the things required for basic functioning in society.
5. Although adults may or may not differ from pre-adults regarding the basic cognitive processes of learning, the context of adult education differs substantially from the context of pre-adulthood. Hence, adults should be educated differently from pre-adults.

Zinn (1983) designed the Philosophy of Adult Education Inventory (PAEI), based on five philosophical tenets, as practiced by adult educators. The following provides an in-depth description of these philosophical ideologies.

Liberal: This adult philosophy purpose is to develop intellectual powers. Liberals always seek knowledge. They work to transmit knowledge and clearly direct learning. The educator is the "expert". He/she directs the learning process with complete authority. Learning methods used include lecture, study groups, and discussion. Socrates, Plato, and Piaget were practitioners of the liberal philosophy. (Note: Liberal adult education does not refer to liberal political views, it is related to Liberal Arts.)

Behaviorist: The purpose of the Behaviorist adult philosophy is to promote behavioral change to guarantee that societies standards and expectations are upheld. Environmental influence is strong in this philosophy. The traits of the behaviorist teacher are close to those of the liberal. The behaviorist "manages" the learning process and directs learning. Behaviorist concepts include mastery learning and standards-based. Some methods of teaching that behaviorist educators use include programmed instruction, contract learning, and computer guided instruction. Vocational training and teacher certifications are both behaviorist practices. Skinner, Thorndike, and Steinberg all believe in the behaviorist philosophical tenet.

Progressive: This philosophy of adult education is concerned with the well-being of society and an individual's role in society. Learners of this philosophy need problem solving skills and practical knowledge. Teaching methods used in this philosophy include problem solving, scientific method, and cooperative learning. The educator is an organizer who guides learning instead of directing learning and also evaluates the learning process. Progressive proponents include Spencer, Dewey, and Lindeman.

Humanistic: The humanistic philosophy seeks to facilitate personal growth and development. Humanists are highly motivated and self-directed learners; responsibility to learn is assumed by the learner. The humanist educator facilitates learning but does not direct learning. The educator and learner are "partners." Concepts that define the humanistic philosophy include experiential learning, individuality, self-directed, and self-actualization. Humanistic teaching methods contain group discussion, team teaching, individualized learning, and the discovery method. Rogers, Maslow, Knowles, and McKenzie are facilitators of the humanistic philosophy.

Radical: The Radical adult education philosophy or Reconstructionist philosophy promotes social, political, and economic change through education. The educator and learner are equal partners in the learning process. The educator is the coordinator of the class and makes suggestions but does not direct the learning process. This philosophy embraces concepts such as noncompulsory learning and deschooling. Exposure to the media and people in real life situations are considered effective teaching methods. Holt, Freire, and Illich are proponents of the Radical adult education philosophy.

Studies Dealing with Philosophies of Adult Educators

In a study of students enrolled in the researcher's classes, Wingenbach (1996) found significant differences between gender and the Behaviorist and Radical orientations. All females were found to have higher mean scores than males in the Radical philosophical orientation. As

noted by Zinn (1990), "Radical [Reconstructionist] adult education also runs against the current of American value patterns" (p. 56). In the Behaviorist orientation, female graduates had higher mean scores than did male graduates, except in the undergraduate group. In this group the males had higher mean scores. The students did not differ statistically in their mean scores for the Behaviorist, Humanistic, or Radical orientations.

These findings differ from the findings of McKenzie (1985). In his study, McKenzie (1985) found significant differences in all five philosophical orientations while comparing business trainers, religious educators, and adult education graduate students (p. 20). Due to the significant differences in Liberal and Progressive orientations between these groups of students certain assumptions about these orientations were apparent in both groups' thinking, while completing the PAEI inventory. Some assumptions might be: (a) the group of graduate students scored higher in the Progressive orientation because of their teaching experience (about 12 years), which has given them an advantage in teaching practical skills like problem solving; and (b) the group of undergraduates scored higher in the Liberal orientation because of their lack of experience, which has not allowed them an opportunity to apply theoretical knowledge outside the university.

Despite the differences in age and years of experience between the two groups in this study, these students can identify, clarify, and reflect upon their educational beliefs and values. The significant differences between the groups in the Liberal orientation may represent the findings of Berger and Luckmann (1966). That is, when individuals enter an existing institution, they begin to express the views reflected in that institution; they begin to speak a common language. In time, once the undergraduate students have gained experience, they may want to repeat the PAEI to check for shifts in their philosophical orientations.

The relationship between identifying a specific adult education philosophy and agricultural education should be an important educational factor for secondary school agricultural educators. Youth and adults differ greatly in their preferred learning styles and educational environments. If agriculture teachers can accept these basic differences, then the teaching methods, procedures, activities, learning environments, and evaluations must differ also for adult audiences. There remains the question of whether actual differences do exist when secondary agriculture teachers teach adults? Previous research shows that significant differences do exist between educators when compared by years of experience and/or gender (Wingenbach, 1996; Zinn, 1990) and educational level (McKenzie, 1985). The researcher is left to ponder, does a methodological difference in agricultural programming exist for adult and pre-adult participants in Pennsylvania, West Virginia, and Virginia? Do agriculture teachers from Pennsylvania practice a significantly different adult educational philosophy than teachers from Virginia or West Virginia?

Purpose and Objectives

The purpose of this study was to increase the understanding of adult education philosophies as practiced by Pennsylvania, West Virginia, and Virginia secondary school agriculture teachers. Specific objectives were to:

1. Determine the demographics of Pennsylvania, West Virginia, and Virginia agriculture teachers who may have taught an adult technology class in agriculture during 1998-99.

2. Assess Pennsylvania, West Virginia, and Virginia agriculture teachers' philosophies of adult education using the Philosophy of Adult Education Inventory.

Limitations of the Study

The study was limited to secondary school agriculture teachers (N=657) in Pennsylvania, West Virginia, and Virginia who may have taught adults in their local communities during the 1998-99 academic year. The PAEI may not accurately represent all adult education philosophies through its listing of questions and responses.

Methods and Procedures

Population and Sample

The target population of this study included all agricultural education teachers from Pennsylvania (N=259), West Virginia (N=95), and Virginia (N=303) who taught classes during the 1998-99 academic year and who were listed in their respective state's Agricultural Educators Directory for the 1998-99 academic year. The researcher obtained original copies (paper and electronic) of these directories from the State Supervisor for Agricultural Education. From these rosters, the population of agriculture teachers was determined to be 657. Proportional stratified sampling was employed to ensure equal representation from each state identified in the target population. A sample size of 314 was needed to represent this population (Krejcie & Morgan, 1970).

Instrumentation

The Philosophy of Adult Education Inventory (PAEI) was used to obtain information for this study. The PAEI was developed by Lorraine M. Zinn to help the adult educator determine his or her philosophy of education and compare it to other educators' philosophies. The PAEI consisted of 75 statements rated on a seven-point Likert-type scale with 1 = strongly disagree, 4 = neutral, and 7 = strongly agree. Total scores can range from 15 to 105 for each of the philosophical orientations. These scores signify the individuals' views toward the five philosophies of adult education.

The educators' highest score is the score that most closely describes their philosophy. The lowest score is the philosophy least like the educators' philosophy. A score of 95 to 105 indicates that the educator strongly agrees with a philosophy. A score of 15-25 indicates that the educator strongly disagrees with a philosophy. Most educators have one philosophy that receives a high score, therefore, that is the philosophy that the educator agrees with and uses when teaching. It is not uncommon, however, for an educator to have two philosophies that have high scores. This occurs because of some overlap in the philosophies. Educators who have other combinations of high scores or have three or more close scores should review their beliefs and look for contradictions (Zinn, 1983). Some common philosophy combinations are Liberal and Behaviorist, Progressive and Humanistic, Progressive and Radical, and Humanistic and Radical (Zinn, 1983).

In previously published studies by Zinn (1987), the PAEI had been determined to be a reliable and valid instrument for measuring adult education philosophies with reported Cronbach's alpha levels at 0.75. The PAEI was designed to be administered, scored, and interpreted by the respondent (Zinn, 1983). The instructions sent with Zinn's inventory were the

original instructions Zinn developed to accompany the PAEI. An additional instrument, developed by the researcher, was sent to assess respondents' educational degree attained, years of teaching experience, geographic location, age and gender.

Data Collection Procedure

Data collection procedures were developed based upon practices recommended by Dillman (1978). The data collection efforts began on May 7, 1999. For the study, the PAEI instrument, demographic questionnaire, cover letter, and self-addressed, stamped return envelopes were mailed to the sample group in Pennsylvania, West Virginia, and Virginia. Two weeks after the initial mailing, follow-up postcards were sent out to all non-respondents. This card reminded the respondent that they had received the PAEI and a questionnaire and that their response was important to the study. Four weeks after the first mailing, a second postcard reminder was sent to all non-respondents.

Five weeks after the initial mailing, the researcher selected 10% of the non-respondents and sent them a new PAEI, cover letter, and demographic sheet. The mean responses of these subjects were statistically compared to the respondents to determine if significant differences existed (Ary, Jacobs, & Razavieh, 1996). Data collection ended July 23, 1999.

Analysis of Data

Data collected were analyzed using the Statistical Package for Social Sciences for Windows (SPSS). Descriptive statistics such as frequencies, means, and standard deviations, as well as correlational and multivariate analyses were used to describe and analyze the research results.

Results/Findings

Adult Educators

For the initial data analysis, respondents for this study were divided into two groups. One group was composed of secondary agriculture teachers in Pennsylvania, West Virginia, and Virginia that included adult education classes as part of their agriculture program. The other group was composed of secondary agriculture teachers in the same three states who did not include adult education classes.

The sample size for the study was 314 teachers comprised of 93 adult educators and 221 non-adult educators. A total of 118 surveys returned were usable in this study resulting in a response rate of 38%. When the response rate was examined by dividing the respondents into adult educators and non-adult educators, there was a significant difference in the rates. For example, 75 of the 93 adult educators returned their survey for a response rate of 81%. Of the non-adult educators only 43 of the 221 educators returned their surveys resulting in a response rate of 19%.

Non-Response Error

An Analysis of Variance (ANOVA) was used to determine if differences existed between respondents and non-respondents. Non-respondents were surveyed using the double-dipped

sampling method. No significant differences were found between the two groups when dealing with philosophies, therefore, generalizations could be made to the entire population.

Demographics of Respondents

Each respondent provided basic demographic information in addition to completing the PAEI instrument. Respondents were asked questions including state, age, gender, degree, years of teaching secondary school, number of years teaching adults, whether the educator received formal education for teaching adults, and whether the educator received monetary compensation.

The average age of the respondents was 44 years ranging from a low of 22 years old to a high of 63 years of age. The minimum number of years taught by the respondents was less than one year and the maximum was 35 years. The average number of years taught by the respondents was 19 years. The minimum number of years teaching adults was one year while the maximum number of years teaching adults was 34 years. The average number of years that educators had taught adults was 14 years.

Table 1

Descriptive Statistics for Demographic Data

Variable	f	P
Groups (n = 118)		
Agricultural Educator Sample	75	63.6%
Non Agricultural Educator Sample	43	36.4%
State (n = 118)		
Pennsylvania	49	41.5%
Virginia	45	38.1%
West Virginia	24	20.3%
Gender (n = 107)		
Male	99	83.9%
Female	19	16.1%
Degree (n = 118)		
Masters	60	53.1%
Bachelors	52	46.0%
Ph.D.	1	0.9%
Teach Adults (n = 114)		
Yes	88	77.2%
No	26	22.8%
Adult Education Preparation (n = 110)		
Yes	62	56.4%
No	48	43.6%
Adult Education Payments (n = 107)		
Yes	69	64.5%
No	38	35.5%

Of the 118 respondents, 75 were adult educators (63.6%). Respondents included 49 educators from Pennsylvania (41.5%), 45 educators from Virginia (38.1%), and 24 educators from West Virginia (20.3%). Ninety-nine respondents were male (83.9%). Sixty-one respondents (54.0%) had an advanced college degree (Masters Degree or Ph.D.) while 52 respondents (46.0%) had a Bachelor's Degree. Eighty-eight respondents indicated they taught adults (77.2%). Sixty-two respondents (56.4%) reported having receiving formal training in teaching adults and 69 respondents (64.5%) were paid to teach adult classes.

Philosophy of Adult Education

Eighty educators in the tri-state area (67.8%) identified with the Progressive philosophy. None of the respondents identified with the Liberal philosophy. Other philosophies represented by the respondents included 25 Behaviorists (21.2%), 9 Humanists (7.6%), and 4 Radicals (3.4%). Pennsylvania educators had the highest percentage in the Progressive group (71.4%), followed by Virginia (68.9%), and West Virginia (58.3%). West Virginia has the highest Behaviorist rate (29.2%), followed by Pennsylvania (20.4%), and Virginia (17.8%). West Virginia had the highest rate of Humanist philosophies followed by Virginia and Pennsylvania. Those rates were 12.5%, 8.9%, and 4.1%, respectively. Pennsylvania and Virginia each had two Radical respondents (see Table 2).

Table 2

Philosophical Totals by State

	Pennsylvania		West Virginia		Virginia		Total	
	N	P	N	P	N	P	N	P
Liberal	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Behaviorist	10	20.4%	8	17.8%	7	29.2%	25	21.2%
Progressive	35	71.4%	31	68.9%	14	58.3%	80	67.8%
Humanist	2	4.1%	4	8.9%	3	12.5%	9	7.6%
Radical	2	4.1%	2	4.4%	0	0.0%	4	3.4%
Total	49	100.0%	45	100.0%	24	100.0%	118	100.0%

Correlation between Philosophies and Demographic Variables

Correlational relationships between the five philosophical categories and the selected demographic variables were examined. The Davis Convention (Davis, 1971) was used to measure the level of association between variables.

Researchers found a strong association between the Liberal and Behaviorist philosophies (.81). There was also a strong association between the Behaviorist and Progressive philosophies (.72). There was a substantial association between the Liberal and Progressive philosophies (.59) as well as the Humanistic and Progressive philosophies (.55) (see Table 3).

The Liberal philosophy has a statistically significant correlation (< .01) with the Behaviorist, Progressive, Humanistic, and Radical philosophies. The Behaviorist philosophy correlated significantly (< .01) with the Progressive, Humanistic, and Radical philosophies. The Progressive philosophy was significantly correlated (< .01) with the Humanistic and Radical

Philosophies, and the Humanistic philosophy was significantly correlated (< .01) with the Radical philosophy (see Table 3).

Correlation between the philosophies and the demographic variables were also examined. There was a statistical difference (< .01) between the State variable and the Humanistic philosophy (-.27), as well as, a statistical significant difference (< .05) for the Adult Education Payment variable and the Progressive philosophy (.19). Both of these correlations show low associations according to the Davis convention.

Table 3

Correlation Between Philosophical Categories and Demographic Variables

	Liberal	Behaviorist	Progressive	Humanist	Radical
Liberal		.81**	.59**	.38**	.29**
Behaviorist			.72**	.42**	.30**
Progressive				.55**	.26**
Humanist					.48**
Radical					
Age	.11	.05	.01	.00	.11
Years	.17	.17	.06	-.03	.04
Adult Years	.15	.09	-.04	-.01	.13
State	.00	-.02	.09	-.27**	-.08
Gender	.06	-.05	.13	-.02	.10
Degree	.07	.10	.10	.01	.07
AE Preparation	.07	.14	.05	.17	.13
AE Payment	.10	.09	.19*	.07	-.04

* Correlation is significant at the .05 level.
** Correlation is significant at the .01 level

Summary, Conclusions, and Implications

One hundred and eighteen secondary agriculture teachers in Pennsylvania, West Virginia, and Virginia responded to the survey with useable data for a 38% response rate. This included 49 educators from Pennsylvania, 45 from Virginia, and 24 from West Virginia. The average respondent was 44 years of age, had 18 years teaching experience, and had taught adult education classes for 14 years. Approximately two-thirds of the respondents taught adults. The group was predominately male with more than half having an advanced degree. Approximately 50% had formal training in teaching adults and two-thirds were paid to teach adult classes in agriculture.

Slightly more than two-thirds of the educators in the tri-state area identified with the Progressive philosophy. None of the respondents identified with the Liberal philosophy. Other philosophies represented by the respondents included Behaviorists (21.2%), Humanists (7.6%), and four Radicals (3.4%). Pennsylvania educators had the highest percentage in the Progressive group (71.4%), followed by Virginia (68.9%), and West Virginia (58.3%). West Virginia has the

highest Behaviorist rate (29.2%), followed by Pennsylvania (20.4%), and Virginia (17.8%). West Virginia had the highest rate of Humanist philosophies followed by Virginia and Pennsylvania. Those rates were 12.5%, 8.9%, and 4.1%, respectively. Pennsylvania and Virginia each had two Radical respondents.

Correlational relationships between the five philosophical categories and the selected demographic variables were examined. Researchers found a strong association between the Liberal and Behaviorist philosophies. There was also a strong association between the Behaviorist and Progressive philosophies. There was a substantial association between the Liberal and Progressive philosophies as well as the Humanistic and Progressive philosophies.

Correlation between the philosophies and the demographic variables were also examined. There was a statistical difference between the State variable and the Humanistic philosophy as well as, a statistical significant difference for the Adult Education Payment variable and the Progressive philosophy.

Implications

After examining the results from this study, it leaves one with the age-old adage, "which came first, the chicken or the egg?" In other words, were the philosophies of the agricultural educators influenced by teaching methods learned in their teacher preparation program or was the selection of educational methods used with adults a result of their philosophical development?

Slightly more than two-thirds of the educators in the tri-state identified with the Progressive philosophy. Keep in mind that teaching methods used in this philosophy include problem solving, scientific method, and cooperative learning. Agricultural educators have long been advocates of the problem solving approach to teaching. Over the past one hundred years, Dewey's Steps in Reflective Thinking, also known as The Chain of Reasoning, The Method of Science, and The Scientific Method, have been recommended by agricultural educators as the problem solving approach to teaching (Binkley and Tulloch, 1981; Crunkilton and Krebs, 1982; Hammonds, 1950; Krebs, 1967; Lancelot, 1944; Newcomb, McCracken, and Warmbrod, 1993; Stewart, 1950).

Has the emphasis on the use of problem solving in teaching high school and adults agricultural education students influenced the philosophical development of agricultural educators? While the data from the study did not lend itself to answering this question, it presents an interesting topic for additional research.

An additional twenty-one percent of the population identified with the Behaviorist philosophy. Once again, the Behaviorist educators utilize programmed instruction, contract learning, and computer guided instruction. Vocational training and teacher certifications are both examples of behaviorist practices. Has the influence of vocational training and teacher certification programs impacted the philosophy of these individuals?

If philosophical development is influenced by undergraduate and graduate education, teacher educators have an excellent opportunity to have a positive influence on potential adult educators. It has long been accepted that life-long learning occurs in the form of problem solving (Newcomb, McCracken, & Warmbrod, 1993). If teachers are prepared to use proven

methods of teaching such as problem solving, it will enhance the quality of their adult programs as well as the level of learning of their adult students. Additional research is needed on the factors that affect the development of adult educator philosophies.

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Philosophies of Adult Education as Practiced by Agricultural Education Teachers – *A Critique*

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The purpose of this study was to increase the understanding of adult education philosophies as practiced by secondary agriculture teachers in Pennsylvania, West Virginia and Virginia. The authors are to be commended for undertaking a multi-state study.

The introduction presented a comprehensive review of literature. The purpose and objectives of the study were clearly defined. The Philosophy of Adult Education Inventory (PAEI) developed by Zinn was used and clearly explained in the text. The authors acknowledge the limitations of the instrument. Appropriate sampling and research techniques were utilized. The low response rate of 38% is a threat to the generalizabilty of the results. Non-respondents were surveyed using a double-dipped sampling method and no significant differences were found.

Authors note that the respondents were divided into two groups, those who had adult education classes as part of their program and those who did not. It is interesting to note that among those teachers who had adult education programs the response rate was 81%, while the response rate among those without adult education programs, the response rate was only 19%. Although the respondents were split into two groups, the groups were not used for analysis. If going to split into two groups, would like to have seen descriptive statistics broken out by the two groups and by state. Table 1 should be titled Adult Educator and Non-Adult Educator and broken down by state.

It is significant to note that nearly 44% of the agriculture teachers had no preparation to teach adult education. Although this was not an objective of the study, it is a significant finding which needs to be addressed in our teacher education curriculums.

The study did find that more than two-thirds of the educators identified with the Progressive philosophy and that there were variations by state. The authors admit that the study leaves many questions unanswered. This study provides a foundation for further research and poises several other research questions.

West Virginia University
Agricultural and Environmental Education

Memo

To: Eastern Region Agricultural Educators
From: Harry Boone
Date: March 5, 2002
Re: Eastern Region Research Conference Call for Papers

The Fifty-Fifth Annual Eastern Region Agricultural Education Research Conference is scheduled for July 6, 2001, 6:30 – 9:30 p.m. at the BWI Marriott Hotel and Conference Center, Baltimore, Maryland. The Conference will be held in conjunction with the Region VI, MATA Summer Conference.

A copy of the *Call for Papers* for the Research Conference is enclosed. Specific deadlines have been established and will be strictly enforced. All papers must be received by May 18, 2001. Submissions will be peer reviewed and the author(s) notified by June 8, 2001.

If you are not planning to submit papers and would be willing to serve as reviewers or discussants for this event, please let me know as soon as possible. The *Proceeding* will be produced as an interactive CD similar to the National Agricultural Education Research Conference instead of the traditional "hard copy."

CALL FOR PAPERS

FIFTY-FIFTH ANNUAL EASTERN REGION
AMERICAN ASSOCIATION FOR AGRICULTURAL EDUCATION
RESEARCH CONFERENCE

July 6, 2001
6:30 – 9:30 p.m.

BWI Marriott Hotel and Conference Center
1743 West Nursery Road
Baltimore, MD 21240

Papers, which describe completed research and have not been previously reported at an Eastern Region Agricultural Education Research Meeting or the National Agricultural Education Research Meeting, will be considered for acceptance.

FOUR copies of the research paper plus an electronic version (Word 2000 preferred) must be submitted. No facsimiles will be accepted. The papers are not to exceed 13 pages excluding the cover page (1" margins, single-spaced, 12-point font, Times New Roman preferred). All tables, figures, references, etc., should be incorporated into the paper. Authors should follow specifications of the *APA Publican Manual (4th Edition)*.

A. Cover page with the name, address, phone number, fax, and e-mail address of author(s) (does not count in 13 page limit).
B. Title (centered, all caps on the first page of the paper.)
C. Abstract – 400 words maximum (place after manuscript title)
D. Introduction
E. Theoretical/Literature Base
F. Purpose and Objectives
G. Methods/Procedures
H. Results and/or Conclusions
I. Educational, Scientific, and Practical Importance of the Study
J. Reference/Bibliography

DEADLINE FOR PAPERS

Papers must be received by **May 18, 2001.** Please send them to:

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2001 EASTERN REGION
AGRICULTURAL EDUCATION RESEARCH CONFERENCE
Paper Proposal Evaluation Form

Evaluator Number: _____ **Paper Number:** _____

Proposal Title: _____

Please rate the attached paper proposal on the following factors. When evaluating the paper, ***circle*** the number that most nearly reflects the value for the respective factor, using the following scale:
1 = Poor, 3 = Weak, 6 = Fair, 9 = Good, 11 = Excellent.

Introduction indicated appropriate conceptual framework was considered in design of study	**1**	**3**	**6**	**9**	**11**
Clarity of purpose and objectives	**1**	**3**	**6**	**9**	**11**
Appropriate research methods and procedures were used	**1**	**3**	**6**	**9**	**11**
Clarity of results	**1**	**3**	**6**	**9**	**11**
Conclusions and/or recommendation are supported by findings	**1**	**3**	**6**	**9**	**11**
Significance of study to the agricultural education profession	**1**	**3**	**6**	**9**	**11**
Organization of the paper, including writing style, grammar, spelling, etc.	**1**	**3**	**6**	**9**	**11**

What is your recommendation for the proposal? (Circle the number that most clearly reflects your recommendation.)

Definitely Reject	Probably Reject	Uncertain	Probably Accept	Definitely Accept
1	2	3	4	5

Please provide comments regarding the proposal. (It is important to share information with the author(s); your comments will be kept anonymous.)

_____

_____

_____

_____

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